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The Providence Water-Works.

From the quarterly report of the commissioners of these works we learn that, although the severe weather in January and February stopped, to a great extent, the outdoor work during these months, the excavations of rock on the lines of force and leading mains have been continued, and a few pipes have been laid on each line. We extract the following from the report of the commissioners: "A fire-hydrant has been designed by the chief engineer, and one in accordance therewith has been made by FALES, JENKS & SONS, of Pawtucket, under his supervision. It has been tested in regard to strength, convenience of use, and efficiency, and has proved satisfactory. This hydrant, when not in use, will be flush with the sidewalk, offering no obstruction to travel. The head will have four outlets, and will be carried by the engines and hose carriages. The hydrants will be so placed that any point on the line of a street may be reached by the attachment of a length of hose not exceeding, on an average, two hundred feet." The commissioners stated, in their fourth quarterly report, October 1, 1870, that "negotiations have been nearly concluded for the construction of a Worthington duplex engine, of a capacity to raise 5,000,000 gallons one hundred feet high in 24 hours, to be in readiness to be used on the banks of the Pawtuxet, on the 1st of August next, for service at that point until another and more powerful engine can be planned and constructed, engine house erected, etc., etc. As intimated in the last report of the commissioners, the engine first above named is designed for permanent use at the Hope pumping station." Since the last report, a contract has been duly executed with HENRY R. WORTHINGTON, and the work is considerably advanced. The price, set up in complete running order, and warranted, is ($35,000) thirty-five thousand dollars. FREDERICK GRAFF, Esq., in his "Annual Report of the Chief Engineer of the Water Department of the City of Philadelphia, Presented to Councils, February 16, 1871" ("being the sixty-ninth annual report upon the condition of the works employed to distribute pure water to the citizens"), in speaking of the new "Belmont Works," says: "Engine No. 1, 'Worthington Duplex,' was started at regular work September 19, 1870, and has since that time been in daily operation, supplying the Twenty-fourth and Twenty-seventh wards. The engine has given entire satisfaction, and is considered, by all competent, unprejudiced mechanics, as a very superior pumping engine, a well executed, creditable job, working without shock in a remarkably smooth and almost noiseless manner, reflecting great credit upon the inventor and contractor for ingenuity of design and perfection of workmanship. The water is raised by this engine through a thirty-inch main, 4,167 feet long, to a vertical height of two hundred and eight feet above the height of Fairmount dam." In speaking of the Roxborough works, he says: "A contract has been made with Mr. WORTHINGTON for a duplex engine for these works, capable of raising 5,000,000 gallons per day into the present reservoir, and so arranged that it can hereafter be made to raise 8,000,000 into a low reservoir, should such be built, without any other alteration than the enlargement of the plungers." While those who have had experience with the duplex engine are enthusiastic in its praise, the height of suction made necessary by our plans in order to be secure from injury by freshets in the Pawtuxet (at least 12 feet), added to the depth of the Natural Filter Basin, precludes its permanent use at Pettaconset, even if there was no doubt otherwise of its superiority to the Cornish. It will be remembered that in its temporary use by us it will pump directly from the river, and be afterwards transferred to Hope reservoir, for which latter service it is *admirably* adapted. The plans and drawings for the Cornish engine, designed for permanent use at Pettaconset, have not yet been completed. As has been heretofore stated, the adoption of the plan of using a temporary engine gives abundant time to perfect a plan and to construct an engine for permanent use.

Vegetable Candles.

In Austria, Moldavia, the Caucasus and near the Caspian sea, a vegetable wax of a yellowish color, fibrous structure and light specific gravity, called ozokerite is found in large quantities. In its natural state this substance will melt readily, but will not burn alone on a light being applied to it. When cut into thin strips and wrapped around a wick it burns readily without further preparation. This substance has been introduced into England by Messrs. SIEMSSEN and FIELD, and works for the conversion of the raw material into a white semi-transparent wax ready for the manufacture of candles have been erected at Battersea, near the city of London.

By means of a steam coil the crude material is melted in tanks and run to a series of stills holding from two to three tons each, in which the ozokerite is distilled.

The distilled material, as it comes from the condensers, is run into moulds and allowed to cool. The cakes thus formed contain an oily substance which is removed by pressing them between oil skins and canvas cloths in hydraulic presses. The pressed cakes are remelted and treated with sulphuric acid in another set of tanks, which are steam jacketed and provided with stirrers for mixing the contents. The purified wax is drawn off into kettles, from which it is run into moulds.

The prepared material is a hard white wax which melts at 140°, the melting point of paraffine being only 128°.

The candles made from this material are said to be of high illuminating power, but somewhat disagreeable to use, owing to the offensive smell of the smoke which arises when the candle is blown out. The use of an extinguisher would, however, remove this objection, or perhaps it could be obviated by other means. The chief of the by products is the oil previously mentioned, which is colorless, free from odor, and gives also a brilliant flame.

Charcoal filters have been suggested in place of the acid bath, but we are not informed whether they have been practically tested. We do not know whether a material like ozokerite exists in this country. It is very possible that it does; and in this case the knowledge of the methed of making it a valuable article of commerce would probably afford a basis for a large fortune to somebody.

The Quartz Mines near Helena, Montana.

The prosperity of the entire Territory, which must in the future depend largely upon its quartz interests, is greatly affected by the success or failure of all attempts at lode g. In the vicinity of Helena, crossing the heads of Oro Fino and Grizzly gulches, are situated the famous Whitlatch Union and Park lodes—the latter an undoubted extension of the former—which is the best developed lode in the Territory. When once the Northern Pacific railroad, now rapidly making its way towards us, renders these mines accessible to capital, quartz interests that to-day command but comparatively low prices will be worth millions. The present, then, is the time for sagacious men to invest, who may wish in the future to reap a rich harvest.

The Hendrie mill, is the first that greets the ears of the traveler up the gulch with the clatter of its stamps. This mill crushes rock from the Hendrie mine, on discovery of the Whitlatch Union claim. This mine was first worked by Mr. WHITLATCH, when he commenced operations on the lode. The rock yielded a rich return, and forty or fifty thousand dollars above expenses were taken from the first one hundred and fifty feet. The mine was then sold to Mr. HENDRIE and others, who have been since working it. Owing to breaks in the formation, the vein has been irregular and difficult to follow, but has paid about the cost of development, till now a solid and permanent ledge of quartz appears in front of the incline, and the possessors have the assurance that the future year will give such a yield as will fully compensate for the labors of the last.

The National mill was built by Professor HODGE, and has now been running for four years upon rock from 200 feet of the vein west of Mr. RICKER. It is at present under the superintendence of Mr. ALLEN DANFORTH, a young man of correct and industrious habits who seems to thoroughly understand his business. He has in his office a complete laboratory for the assay of ores, and for assaying and refining the gold. He also assays all the tailings from his mill, and keeps a correct record of the same. The mill runs very steadily, and the hoisting and pumping works at the mouth of the shaft are enclosed in a handsome and substantial stone building. The new Cornish pump drains the mine, and, indeed, goes far to keep the entire hill dry without exerting half its capacity, and all the machinery works as smoothly as a Waltham watch. It is a pleasure to walk into this capacious and cheerful engine house, more especially at the time of changing the shifts when the men are emerging from or entering the mine. This is the deepest, "incline" on the lode, its bottom being about five hundred and fifty feet from the surface. A lateral depression of the vein is observed on this claim, the lode rising from it to the East and West in a gentle slope, maintaining all the time about the same degree of inclination going down on the vein. At the depth reached, the vein is more solid, permanent and regular, we understand, than at any point above on the incline, and certainly the vast reserve of quartz in sight, the immense and continually increasing pile at the dump, which gains steadily on the capacity of the mill promises that the past prosperous career of this company will be more than equalled by its future. Indeed, it would seem to have reached but the beginning of its prosperity, for there can be no doubt that the vein, which is so solid and regular at this the deepest point reached, can be the easier followed, as science is continually improving and cheapening mining machinery, and rendering the working of deep mines safer, easier and more profitable.

The I. X. L. mine, owned by Mr. J. C. RICKER, is situated between Hendrie's and the National. The shaft, or rather "incline," on this lode is now about five hundred feet deep. This has been one of the most profitable mines on the hill. Mr. RICKER started but a few years since, and, we believe, has cleared the mine and mill out of the profits of the ore, besides making his current expenses, and now has a practically unlimited source of revenue before him. He has just been putting in new and convenient steam works for hoisting ore and keeping his mine dry. These new works perform the duty completely, keeping the mine dry and comfortable, and hoisting the ore. A large pile of splendid rock is rapidly accumulating on the dump, while the mill has been overhauled and put in thorough order, previous to opening its batteries on the ore raised by the new hoisting works. In front of the miners below, a fine vein of rich quartz presents itself, which is being systematically attacked under the direction of the foreman of the mine, MATT. PRICE, who deserves great credit for the excellent condition of his mine. The Columbia mill is the largest in the Territory. Everything about it is in perfect order, and it is a magnificent sight to see its vast machinery moving and its thirty stamps coming down on the rock. Mr. B. F. TATEM, the Superintendent, is evidently not only a man of excellent judgment and systematic and orderly habits, but thoroughly understands the duties of his position, and the art of successfully conducting a first-class mine, the first principles of which he learned among the mines of Pennsylvania. This mill is provided with every improvement and necessity in mining machinery, such as pans, rock-breakers, etc., besides many conveniences added by the ingenuity of the Superintendent to facilitate cleaning up, and running his bullion into bars for shipment. In his office, Mr. T. has a complete assayer's outfit, where he runs into bricks the product of his mill, makes assays of the tailings and of other ores, and performs all other duties necessary to an accurate and thorough knowledge of the ores that he is operating upon, and the working of his mill. Everything about the mill and offices has, in addition to the marks of good management, that air of general prosperity which comes from continued success, and which can be felt more readily than described. At the mine everything is also in perfect shipshape. The hoisting machinery is powerful, and enclosed in a substantial building. The incline is down about five hundred feet, and is being pushed steadily forward, while large gangs of miners are engaged in breasting out ore from the reserves. The vein is very regular, and the mining is conducted systematically and properly, under the supervision of Mr. POWERS. The ore on this claim is remarkably even in its average yield. On other claims richer ore has been found in spots, but in this mine the yield has been more regular; and, given the area of vein worked out, or the number of tons crushed, the gross product as well as the net profit can be calculated very closely. There is, therefore, little of the uncertainties, of the excitements or depressions generally incident to mining, and indeed to nearly all pursuits, about this mine, which continually pays a fair and steady profit above the cost of milling the ores. When gold or silver mining takes this shape, we know of no business that is more desirable. The producer, unlike the manufacturer or farmer, never has to look for a market for his wares, and is subject to no depressions or excitements in the mercantile world. The product of his mine has a standard value; in fact, is itself a standard of values, and when the miner has cleaned up his plates or his sluice-boxes, his work is finished at a point where the troubles and anxieties of other producers often commence.

Perhaps the mine that has yielded the greatest return of any on the vein for the labor expended, is that known as the "Whitlatch Mine," on the Owyhee or Parkinson location, formerly worked by WHITLATCH, the PARKINSON BROS., ARGYLE and MCCLURE, and latterly by WHITLATCH, ARGYLE and MCCLURE. The incline on this claim is about three hundred and fifty feet down on the vein, which presents in front a very fine appearance. A large portion of the ore from this mine has yielded greater returns than from any other mine on the hill. Large vaults or chambers of ore have been found where the vein was very thick, and a great deal of ore remains to be taken out from the reserves of the mine, as soon as operations are commenced. The owners of the mine, or at least one of them, having become embarrassed from outside causes, gave a mortgage upon the interest in the mine owned by him. This mortgage falling due has resulted in a temporary stoppage of the mine until this interest can be cleared or negotiations which are pending to sell the entire mine to an Eastern party, with ample means to properly open it and erect steam hoisting works, are completed. During the past winter a number of very profitable runs were made on rock from this mine by Messrs. MCCLURE and ARGYLE, and the parties in whose hands Mr. WHITLATCH's interests were placed; but on the return of the latter gentleman from New York operations

were suspended. A long conversation with the foreman of the mine, and with the head miners who have worked on the adjacent claims, and a thorough exploration of the mine under the guidance of these practical men, convinced us that this is to-day one of the most valuable mines on the continent; and that as soon as the difficulties alluded to are removed and the working resumed, we will again commence our weekly chronicle of the big gold bars cleaned up from the plates of the Whitlatch mill. This is the only claim on the vein not provided with steam hoisting works and other apparatus for economical working. The rock has been raised by horse power, and the mining has evidently been conducted more with a view of getting quick and easy returns than with any regard to a thorough and systematic exploration of the ground. There would be a little difficulty in taking out thousands of tons of good paying ore without running the incline to a greater depth than it has now attained; but as the miners say, it would be a hard necessity that would compel the owners to do so, for the mine ought now to be pushed ahead in all directions in systematic and proper shape, as merely the surface of the great and rich deposits of the permanent and unshaken portion of the vein, as developed on the contiguous claims, has been reached.

Beyond this ground the PARKINSON BROTHERS have eight hundred feet on which they will soon commence work, with the intention of developing the vein. Then comes one thousand feet owned by the members of the Whitlatch company, and then the lode is cut by Grizzly gulch, the placers of which gave rise to the settlement and foundation of Helena. West of this gulch is the "Park," which we expect will be the scene of lively and remunerative placer mining as soon as the waters of Park Lake ditch commence to run, and the vein is continued here under the name of the Park lode.

Since Mr. WHITLATCH commenced work on the Whitlatch Union lode in 1865, the yield of the mines on the portion of the lode we have reviewed, as compiled from the returns of the different companies working the same, has been $2,000,000. As the first year or two were mostly consumed in opening the mines, erecting mills, and providing other facilities for raising and crushing the ore, it would scarcely be fair to strike an average by dividing the amount by the number of years. The first years were years of experiment, and not of the steady and never-ceasing mining and milling which now prevails. The mill or mills then erected did not run steadily, and were often experimenting on other ores from lodes in different parts of the country; but even the first product of the mines in 1865 was 1,000 tons selected ore, worked in a ten-stamp custom mill, and yielded $63,000 gold; 80 tons of ore, five and a half days' run in the same mill, yielded $71 91 per ton; and an eight-stamp mill in one week produced $8,240 86; in 1867, five runs of 80 tons each yielded $26,000; and one 90 ton run yielded $6,000, and one ten days' run of ten stamps yielded $11,000. The books of one company show $422,462 29 as the total product of twenty-two months' continuous crushing at their mill. The product of another mine is estimated at half a million. Five mills, containing excellent machinery, pumping and hoisting works of durable structure and great power, neat offices, boarding-houses and dwelling-houses, prosperous little villages, and comfortable homes, have sprung up in the neighborhood of these mines, and add their testimony to the assured and permanent prosperity of the place. The superintendents of the mines, satisfied with their workmen, and desirous of making them contented and steady, have lately voluntarily raised their wages about 25 per cent., without any demand or requisition on the part of the workmen whatever; and never before in the history of quartz mining in our Territory have the prospects of the future been so bright for the quartz interest around our city as during this spring of 1871. From other parts of the Territory these notes of prosperity are re-echoed; from Radersburg, Cable City, Silver Star, Summit, Argenta, Highland, and Rochester, and other quartz camps, good tidings are brought in, and verified by shipments of gold and silver bullion unequalled in amount as the products of vein mining since the discovery of Montana. Thus the rich, permanent interests of our Territory are being developed, even in advance of the construction of that great continental highway which is so soon to traverse our valleys, and the completion of which will remove many of the difficulties that still surround us.—*Helena Gazette.*

Lecture on Coal: What It Is—Where It Is—How It Came There, Etc.

THE following interesting paper was read at Castleford, by Mr. J. WARBURTON, an English mining engineer. After some prefatory remarks, the paper opened with some observations as to the formation of coal, and then went into its constituents, as follows:

WHAT COAL IS.

The main elements in wood and coal consist of carbon, hydrogen and oxygen, with a few other substances in very small quantities, so small that for our purpose we shall dismiss them. In coal carbon forms by far the largest proportion, and in the coal farthest removed from woody appearance is the most carbon found. But the increase of carbon and the decrease of oxygen and hydrogen are so gradual, that the line where woody matter ceases to be wood, and coal begins to be coal, is not very easily defined. A protracted lawsuit was instituted in Edinburgh to try the question "What is coal," in the year 1853, in which the best chemists, microscopists, mineralogists, and geologists, scientific and practical, were called. A gentleman had a lease of all the coal under a certain acreage. In process of operations he discovered that the material in question was very rich in mineral oils, and began to work it for such. The demand was so great that he was enabled to make enormous profits. The landlord did not like to see this, and not able to share the increased value; so he got up an action at law, and was able to find very many men of science to state in evidence, before the "Lord Justice General" and a special jury, that the substance in question *was not coal.* There were as many men of acknowledged science on the other side to prove that this very substance *was coal.* After hearing this kind of contradictory statements for five days, the judge ignored the whole evidence, and said, "To find a scientific definition of coal after what has come to light within the last five days, is out of the question."

The received notion of what *coal* is has been that it is a substance, not being wood, which will burn and maintain a fire. I am not in a position either to affirm or dispute such a statement. But aside from this, and to consider "coal proper"—or that substance best known to English people as coal—we are in some measure able to see what it consists of. The greatest diversity appears when we come to define what I have called coal proper, and the shales that contain mineral oils, and possess all the properties of combustion that our common coal does, but void of that characteristic fibre so distinct in the common English coal. The great difference in this case also is due only to the proportion of the elements that form the whole; for although physically there is such apparent difference, chemically they are the same in kind—more of some and less of other elements make all the difference so manifest in appearance.

It will be seen how sensibly but gradually the carbon increases, while hydrogen and oxygen decrease, till we arrive at that kind of coal called anthracite, which is the farthest removed from woody tissue. We find by an analysis of Welsh anthracite that for 100 parts of carbon it has only 6·12 of other elements. Boghead and cannel belong to a species of coal the exact origin of which it is difficult to determine. The fibre and granulated condition is in a far less degree perceptible, but perceptible it is not with the naked eye. Its breakage also differs widely from common coal. That which has given rise to the terms "end and board" is not manifest in cannel coal. The more recently formed coals have very nearly all the characteristics of wood physically. Wood has its grain, as we call it—it is composed of long fibres, extending lengthways of the tree, and the cutting it up into boards is always done parallel to this fibre. The cuttings thus made from a balk of timber, or tree, are called *boards.* Coals proper have exactly the same fibre, but are never found at right angles or vertical to the bed on which the coal rests—the direction of the fibre is not from floor to roof, but horizontally. There are a few specimens here. This long piece is exactly like a board, and you will see its fibre running lengthways quite distinct. From this resemblance to woody boards we speak of coal presenting this broad side as coal *on board,* and the other view, at right angles to it, as *end,* which it really is. It has also another character like wood—conductivity of sound.

When a boy at school we used to conduct practical experiments by speaking from end to end of a balk of timber. We can also speak through a solid mass of coal, either board-ways or end-ways, but through a much longer distance end-ways than board. This can very easily be accounted for. The sound going end-ways on the same unbroken fibre from the point it is given to the other end; boardways it is not so, as it must cross the fibre, and thus encounter far more resistance. All coals, except those farthest removed from vegetable matter, as anthracite, have this distinct fibre. You will be able to see what elements constitute coal; but as to the proportion of these elements, how and when, in the stage of conversion, they have arrived at that which shall be called coal, I cannot say. How much carbon, or of anything else combined, shall be said to be coal has not yet been decided. So that it is still open what shall and what shall not be called coal. The gap thus left between what may be called coal at its commencement, and that the furthest in the scale is so wide that, in a commercial point of view, it is difficult to deal in. From what we have seen I think it will be pretty clear that coal is of vegetable origin, and that its passage has been very gradual and sensible; and that it is chemically composed of the same elements as wood, differing only in quantity and degree, not in kind.

We will now consider the second part of our subject.

WHERE COAL IS.

In treating this division, it will be necessary to speak a little geologically; but not as a whole, only so much as is necessary to have a clear idea of the position of our coal. Happily, our earth is not like an orange, similar though in form. As before named, it is composed of rocks; and these are so arranged in England and Wales that we can see and examine no less than 73,350 feet in depth of them, and without descending deep pits. This thickness is exposed to open day, and can be examined by the aid of sun light. This appears paradoxical, but we shall soon be able to solve it. It is in the carboniferous system of rocks that coal is found. The average thickness of these rocks containing coal is some 5,000 feet. Above the top of this 5,000 feet come other systems of rocks of no less than an average thickness of 4,850 feet. Now, if we talk about the shell of the earth, we have one of 4,850 feet covering the coal nearest to us, a depth we should experience some difficulty in breaking or peeling off to get at the coal. But, had this been a shell or crust, in the sense we understand these terms, coal would never have been discovered, but remained hidden beyond the ken and reach of man to the end of time. Our coal is in the earth, and the nearest seam or bed is 4,850 feet below the most recent formation, and the deepest seam is 9,850 feet below it—a depth we do not contemplate arriving at. But, by some law, or combination of laws, of Nature, we have in certain localities seams of coal brought right to the surface, and occasionally standing out from the surrounding rocks, as it were, looking at man, and asking to be taken into his service. Like many other things of value, its presence was unheeded for centuries. The earliest recorded evidence of its being used is by a Greek author named Theophrastus, who is said to have lived 240 years before the Christian era, consequently about 2,111 years since. In modern times he is made to have said: "They call those fossil substances anthracite, and, when they are broken up for use, are of an earthy character; nevertheless they inflame and burn even like charcoal, and are much used by the smiths." This is said to be the first noticed use of coal which would be found on the surface. And, although it is an article of such importance, it is much better that it should be down in the earth and covered up. Indeed, its covering is an essential to its present condition. And to the lords of the land it is a source of great value, so much so that there are numbers of instances where the seam of coal alone produces more cash value to its fortunate owner than the sale of the whole estate were the seams of coal absent; and yet the surface lands remain intact and valuable.

A glance at the geological map of England and Wales will convince you that a very small amount of England—small as she is—contains this valuable mineral. England and Wales are said to contain 57,813 square miles. The coal-bearing strata are about 3,435 square miles, or about 1-17th of the whole area. In the northern coal field there are more than 200 square miles under the magnesian limestone and new red sandstone, the Monkwearmouth colliery being sunk through these measures. A still greater amount is taken under the same strata on the east of the large Midland coal field. The shafts at Newton here just pass through them, and had it not been for the denudation by the course of the river, the thickness of the limestone and sandstone would have been more than four times that now found there. Denaby and Shireoaks are also on the same line, and the order of strata comes in proper succession. The dip, or inclination, is in a south-easterly direction. The coal goes directly under the Permian measures. A seam of coal coming to the surface a little west of Leeds, will be over 2,700 feet deep at Denaby. Denaby colliery, although practically in the Permian, has not passed through it in its sinkings, owing to the fact of its being in close proximity to the river Don, and the denudation by its currents, together with its position being in a recess, so to speak, as the eastern escarpment of the Permian has bays further inland—or, in other words, the Permian series come out in a kind of zigzag form. It is in one of these bays that Denaby shaft is sunk. At Shireoaks, still further south, the shaft went through 196 feet of the Permian strata ere they met with the true coal measures, thus proving that coal may be expected under these measures, but at what distance as yet no one can say, though in all probability it will be found so far eastward under the new red sandstone and magnesian limestone as we shall like to go. But I would not like to venture a limit to depth, as so far appliances have been equal to any depth it has been necessary to go. The two most prominent obstacles are pressure and heat. The former I do not consider of much moment; the latter—heat—may be an obstacle, but not a very serious one, down to some 3,500 feet, although, according to observations made variously, Professor HULL says the temperature at that depth would be—the surface at 50°—111.44°. I am inclined to think that in practice this would not be so high in a well ventilated pit. And I am not satisfied in my own mind as to the mode of experiments to ascertain the temperature of depths. Nor do I think the rule adopted as to the ratio of increase of temperature is upon a solid basis. Mr. GEORGE ELLIOT, M. P. for North Durham, had some valuable experiments made, and came to the conclusion that increased temperature was due to pressure, and not to depth, in the abstract—*i. e.*, if an entry to a seam of coal were made at the level of the sea, and proceeded in the seam under a mountain 600 feet high, the temperature will be the same as in a seam 600 feet below the level of the sea, so that our experiments on this subject are by no means complete. But should the temperature increase at the rate arrived at by several gentlemen—1° for every 70 feet—I have a hope we shall be able to reduce it considerably in the working places by passing currents of fresh air at moderate velocities, and, if need be, injecting on a large scale air compressed very high, so as to be delivered in the workings at freezing point. This, or some other means, will be got at whenever the circumstances require it.

From what has been said, we shall all be satisfied that coal is embodied in the earth, and that there are seams of it at very great depths from the present surface. The greatest depth at which coal is being wrought in England is 2,418 feet, at a colliery near Wigan, called Rosebridge. Deep as this is, I have no doubt that twenty years hence will see shafts over 3,000 feet deep.

Having gone so far in trying to show that coal is of vegetable origin, and that it is in the earth so far from the influences which support and develop vegetation, we naturally glide into the third division of our subject—"How came it in the position we find it?" We proved in the first part that coal and vegetable matter chemically are identical, changed only in character and degree, the composition being the same elements; nor would it be a hard matter to prove physically, as well as chemically, that coal is of vegetable origin. Take a few of the specimens that are on the table, you will at once recognize perfectly legible imprints of vegetation with which you are familiar. But you say these specimens are not coal. So they are not: they are shales, or stones, having the impress of vegetation, and not the vegetation itself. The vegetation has become coal; but this shale, or stone, was deposited upon the vegetation, and while soft received the impression, like clay or plaster of Paris will when pressure is brought to bear upon it. You show me your photographic likeness; it is not yourself, it is an imprint of you, and not you at all. So with those specimens; but beyond this, with the aid of a good microscope, and sometimes with the naked eye, it is easy to discern in coal itself the impress of some form of vegetation. Take this piece of coal, for instance, and you will see on it the shape and impress of a cone-like substance, which I think is one of the im-

pressions Professor HUXLEY spoke of in a communication to the *Contemporary Review*, of November last. This I take to be the impress of a spore-case, and when I first got it there was a very thin substance, flattened so much that looking at it endways it was not to be seen; indeed, it was so thin and delicate that I could not preserve it. Professor HUXLEY and Professor MORRIS say that it is made up of those plants nearly allied to the living club mosses, and I should incline to think that future investigation will tend to confirm this.

This subject is considered the most delicate of all connected th geological investigation, on account of the time it must have taken to form so many coal seams, occupying the same area. There can be no doubt of this; but to get over it we try to pacify our consciences that there must have been something special in the formation of the coal measures; or, in other words, a miracle must have been performed in this particular division of our earth, I have no such idea. The carboniferous system must have been formed and got into its position by an unalterable law of Nature, and it is more in keeping with intelligence to frankly own that our inability to see through it rests in ourselves, and is owing to limited capacities. Being manly enough to acknowledge so much, we shall be encouraged to toil on investigating this mysterious yet interesting subject.

HOW THE COAL CAME TO BE DEEP DOWN IN THE EARTH.

There can be no two opinions about this division of our subject. The beds of coal, once being the surface, must have been submerged in the direction of the dip or declivity, and elevated at the opposite point, where so many seams are found coming to the surface. The covering, or shale and stone, which overlie the coal beds is what has been washed from the elevated places into that part which had become below the original level, by the very same agency that had raised its other portion above the original level. This washing is called the process of denudation, which is always going on, even now, though on a somewhat less scale than formerly. This process of elevation and depression is manifest in all coal fields, but much more striking in some than others; the most elevated being, as a matter of course, nearest the point of eruption, or centre of elevation.

We must now pass on to notice our fourth and last divison.

HOW AND WHY IT IS REMOVED.

Having sunk our shafts and won the coal, it is hewn out by manual labor. The precise mode of hewing would be difficult to explain in a lecture room. Suffice it to say that men have sometimes to lie down on their sides, and in other various and awkward positions. A writer in the *People's Magazine*, of this month, has some very strong but ignorant remarks on this subject, charging colliery owners and managers with, at the least, a degree of negligence which a class of people with very obtuse faculties only could be guilty of. The part most important in this division of our subject is the great price of human life at which our coal is got. This is the most lamentable part of all. In the year 1869 not fewer than 1116 lives were lost in our British coal mines, besides the infliction of pain, suffering, and loss of limbs to not fewer, on a moderate calculation, than 3100 human beings, in addition to that which may be called relative suffering caused by the loss of the 1116 lives, such as widows and orphans. This cost is very heavy, and our endeavors ought to be to lessen the amount of suffering. Lessen it, we have done; if not in numbers yearly, we have in comparison with the quantity of coal produced. But I am free to admit that all is not done that may and ought to be.

The class of accidents by which most lives are lost is that by falls of coal and roof. This is heaviest year by year, and inflicts most suffering, not only to the victims, but to the widows and orphans. There is no public subscription or outside help for these cases. All we hear of them is that the accident is owing to the man's carelessness, and the public are not sparing in attributing suicidal tendencies to the poor victim. This is merely chimerical; the collier's life is as precious to himself, and his wife and family as dear to him as most other people's. The great thing, however, is that he is ignorant of the laws of preservation of life and health, for which he is not alone responsible. I do not use the word ignorance in its ordinary sense, but as implying the inability to perceive the altered and constantly altering condition caused by his own operations; or, in plainer words, every collier examines his working place ere he begins work, and receives his impression of the condition of it. This impression remains with him, and he toils on unconscious of the alteration made by his operations. It is this that is the prime cause of so many deaths by falls of roof and coal; and the only remedy I see for it is by increasing the number of officers in the workings, so that each working place may be visited several times during the working hours, and thus be able to get a fresh impression of their condition each visit, and to require the workmen to take steps each time to make the place safe. This carried out, I am convinced accidents by falls of roof and coal will be reduced full 50 per cent. If coal is so costly to human life, why spend that amount of life in its production? Simply because in our state of civilization coal is an indispensable commercial and social commodity. This is enough for a lecture itself, so that I cannot enter into all its social and commercial uses. Socially coal is of immense value. The light by which I am now reading is light from the sun which was absorbed by the coal when in its vegetable condition; and not only the light simply, but the very tints of color that might have been seen fluttering on the vegetation is reproduced, and the beautiful mauve and other loveable colors are obtained from coal. The *Chemical News* of February 3 last informs us that coal-tar colors may be counted by the dozen. So that the bewitchingly beautiful colors upon the still more beautiful heads of our ladies may be looked upon as the production of our coal pits. Now, do not think any the less of them after being told that they come out of such a dirty place; rather let it enhance your estimation of the workers in coal mines.

One other aspect, and I have done. In the production of coal there are not fewer than 345,446 male persons employed, finding the means of sustenance for fully 1,727,230 persons, besides the numbers that are employed in its transit and consumption. Surely an industry that affords the means of sustenance for a twentieth part of our population is one that cannot be looked upon as insignificant, but of some importance, contributing to the comfort and well-being of our social life, and the aggrandizement of our country in the eyes of the whole world.—*London Colliery Guardian.*

Polytechnic Club of the American Institute.

Meeting held at the rooms of the Association, April 13, 1871. The President (Prof. S. D. TILLMAN) in the chair.

THE President (Prof. S. D. TILLMAN) read the following notes of scientific progress:

I. SPONGY IRON AS A FILTER.—VOELCKER calls attention to the use of spongy iron as a deodorizing material of greater potency than animal charcoal. Sewage water passed through a filter of spongy iron is completely purified, and this water, after having been kept six months protected from the air, was perfectly sweet and free from fungus growth. The spongy iron was obtained by calcining a finely divided iron ore and charcoal.

Mr. THOMAS D. STETSON: One of the great virtues of animal charcoal lies in the facility of restoring it and making it almost as active as before. If this iron can be used but once, it will be a great drawback upon its usefulness. The deodorizing property of any filter continually grows less, until it is saturated. We can then subject animal charcoal for a certain length of time to a pretty high heat, and it is revivified. Sugar refiners do not give the same price for it, because it is not as active as fresh coal; but it is nearly as active. If this iron cannot be treated in that way, it would be an objection to it. But if it were more active in deodorizing or discoloring than the best wood or animal charcoal, it would be very important in the arts.

The PRESIDENT: I suppose that charcoal stands at the head of all substances in that respect.

Dr. VAN DER WEYDE: Animal charcoal deteriorates so much, that after a great number of reburnings they sell it, and it is used for manure on account of the phosphate of lime in it. Wood charcoal is not so porous, and it soon becomes choked up. When petroleum began to be used for lubrication, it was necessary to remove the impurities in it by filtration. For that purpose nothing has been found better than animal charcoal. For this purpose, the charcoal may be reburned oftener than in refining sugar, because the pores get filled with lime from the sugar. In the reburning of the charcoal, it is put into a retort and the petroleum is distilled out of it before it is burned.

II. VENTILATION OF HOUSE-DRAINS.—The *Builder*, in reviewing the report of the Royal Sanitary Commission, says: "The basis upon which a system of ventilation of drains must be effected, is the consideration that sewage consists of two fluids, the one liquid (the sewage proper) and the other gaseous, the foul air liberated by the decomposition of sewage; and as these two kinds of fluid travel in opposite directions—the one downward, by gravity, and the other upward, by reason of its having less specific gravity than the atmosphere (at least some of the component gases have, and those most injurious to health), it follows that, to construct a channel merely for the one part, without completing the work by providing an exit for the other, is to make an imperfect work; for as the formation of gases cannot be prevented in the sewers and drains, they will accumulate in the higher parts of the drains (and those are in and close about the houses), until their elastic force drives them through the traps and soil-pipes into the houses, unless a ventilating pipe be so connected with the drain as to carry off those injurious gases. A plan, which has succeeded, is to carry up from the head of every house-drain a pipe, of three or four inches diameter, to the top of and a few feet above the highest part of the roof of the house. The eruption of the confined gases will not then tend to force themselves through the traps, but will freely ascend the channel provided for them, and when they make their exit from the mouth of the pipe above the roof, they become sufficiently diluted with atmospheric air to become harmless to the dwellers below, for they have the tendency to still further ascend, until, indeed, they become practically annihilated."

The PRESIDENT: This subject has been agitated a good deal in England since the death of Prince ALBERT. It will be recollected that the fever he caught was owing to a defect in a drain-pipe near the window of his sleeping room.

Mr. J. K. FISHER: In an office in which I was engaged some time since, the gas bubbled up through the water-trap so that the room was scarcely tenable. I suspected that the mischief was caused by the *Herald* office exhausting steam into the sewer. I have seen in several places steam puffing from the sewers, showing that steam-engines are exhausted into them. If the sewage passes rapidly through the sewers, there will be less foul gas, and it will be less injurious in quality. There is a general want of engineering skill in the construction of sewers and in the laying of drain-pipes. They do not discharge as rapidly as they should, and they are often not made of suitable materials.

The PRESIDENT: I have no doubt that one of the chief causes of disease in this city is the foul air passing off from the sewers.

Dr. J. S, DIEHL: It appears that the ancients were cognisant of the necessity of the ventilation of sewers. The Temple of Belus, supposed in the days of HERODOTUS to be the Tower of Babel, and 225 feet high to-day, is ventilated by parallel perpendicular flues connecting with a subterranean passage leading to the river. In all the old cities there are regular sewers from four to six feet apart which constitute a perfect system of ventilation. The Pyramids have flues running up and down, connecting with the water; and the water connects through a subterranean passage with the Nile. In all these great works they ventilate their sewerage, carrying off the gases. The Arabs, where they do not have these, keep their mouths shut, which is the secret of health.

Mr. T. D. STETSON: There is an excuse for our New York city sewerage, that it has been built by piecemeal. We have had a succession of political changes as the city has gradually extended northward from the Battery, and we have had a succession of engineers, no one of whom has had nerve enough or confidence enough in his tenure of office, to go to work and tear up the streets of New York to lay down a new system of sewers. They have been content with amelioration, instead of radically changing the system that they found there. As to exhausting steam into the sewers, I am confident if it could be proved and brought to the attention of the Croton Board, severe measures would be taken to prevent it.

The PRESIDENT: Certain portions of our city were built up without being properly drained; and these are now centres of disease.

Dr. SHEPARD: When there is a heavy rain at the time of high water, when the ends of the sewers are under water, the traps are often entirely incompetent to restrain the air; and it will sometimes come back with so much force as to scatter the contents of the sink all over the room.

Dr. VAN DER WEYDE: When the New York Medical College, in Thirteenth street, was in existence, there was a piano factory which exhausted its steam into the sewer, and it caused us much inconvenience in the dissecting room. We supposed it was an unavoidable evil, and submitted to it; but it was a great nuisance:

III. ORCHILLA.—One of the most precious colors known to the dyer is that produced from a kind of moss which grows on bushes and stones near the sea. Its existence in Lower California has lately been discovered. It is so abundant along much of the coast, that one person can gather a quarter of a ton in a day. The best quality brings, in England, about $300 per ton. The dye from the orchilla, or archilli, as the English call it, furnishes a color that is said to rival that made from the cochineal. Plantations where the cochineal insect is bred have become unprofitable for several years, in consequence of the competition of the orchilla colors produced from the lichen brought from Africa.

IV. FUNGUS THE CAUSE OF WHOOPING-COUGH.—Dr. LEITZERICH, the pathologist, who some time ago published his observations on a fungus, supposed by him to produce diptheria, has more recently made a series of experiments with another form of fungoid growth which he believes to be the cause of the very infectious disease, whooping-cough. The spores found in the expectorated mucus, causing the irritation and coughing, were allowed to vegetate into large masses, and small portions were then introduced into young rabbits by an opening in the windpipe. The wounds thus made soon healed, but the animal became affected with a violent cough. Several animals thus diseased were killed, and the air-passages in each were found to contain very large quantities of similar fungus. These observations, so important to the advocates of the germ theory, have not, as yet, been confirmed by other investigators in the same field.

V. PRODUCTION OF IODINE.—A method invented by THIERCELIN has been successfully used in extracting iodine from crude Chili saltpeter. The mother liquors, resulting from the manufacture of saltpeter, are treated with a mixture of sulphurous acid and sulphate of soda, and the iodine will be precipitated as a black powder. This is placed in earthen jars, on the bottom of which are layers of quartz-sand, fine at the top and coarse at the bottom; from these jars it is removed by earthen spoons lined with gypsum, and the greater part of the water is thus separated. It is further purified by sublimation, but is often sold before undergoing the last-named process. The amount of iodine thus reclaimed from Chili saltpeter already amounts to 30,000 pounds per annum. As the removal of all traces of phosphorus is essential in the conversion of iron into steel, the use of crude Chili saltpeter in the converting crucible would doubtless prove valuable in removing phosphorus as well as other impurities.

VI. IS INSTINCT INHERITED EXPERIENCE?—Prof. J. LE CONTE, of the California University, in a recent letter to Prof. TYNDALL, of London, on an optical illusion, says: "Whether the seeing of objects in their true position be in man a primary or an acquired faculty, may, perhaps, always be a vexed question. My own belief is, that it is partly the one and partly the other—that a capacity is innate, by virtue of which the very complex knowledge involved in vision is rapidly, almost immediately, acquired. The actions of all animals are determined partly by experience and partly by instinct. But instinct itself is, probably, but an inherited capacity, improved by the experience of thousands of generation—a sort of inherited experience. In insects the wealth of inherited experience is great, and of individual experience is small; while in man the reverse is true. I think that no one can doubt that a new-born chick or a new-born ruminant sees objects in their true position. Is it improbable, then, that in man also erect vision is partly the result of inherited experience, though confirmed and strengthened by individual experience—the former inherited through all human generations, or even, perhaps (Darwinians would say), through all vertebrate generations?"

VII. MAGNETIC SPECTRA.—Professor A. A. MAYER, of Pennsylvania, has invented a new method of fixing, photographing, and exhibiting magnetic spectra. He first coats a clean plate of glass with a solution of shellac in alcohol, in the same manner as a photographic plate is coated with collodion. After the plate has remained a day or two in a dry atmosphere it is placed over the magnet, so that the under surface of the plate just touches the magnet. Fine iron filings of Norway iron, which has been repeatedly annealed, are now sifted uniformly over the film of lac. The spectrum is then produced on the vibrating plate by letting a light piece of copper wire fall vertically upon it at different points. The plate is now cautiously placed on the end of a cylinder of pasteboard, which serves as a support in bringing it quite close to the under surface of a cast-iron plate, which has been heated over a large Bunsen flame. Thus the shellac is uniformly heated, and the iron filings sink into the softened film. When the shellac is hardened it fixes the spectra. When photographic prints are to be made from the plate, the heat is allowed to act until the metallic lustre of the filings has disappeared, and the film appears quite transparent; but when the plate is to be used as a magic-lantern slide the heating is not carried so far. Many plates have been made by this process, showing the action of single magnets of various forms and of juxtaposed bars, as well as the effects of electric currents led by wires through holes drilled in plates. Among the most interesting are those spectra exhibiting the inductive action of magnets on bars of soft iron and the interaction of magnets and electric currents.

Hydraulic Train Lifts.

THE terminal points of the railways from Aix-la-Chapelle to Homburg, and from Oberhausen to Ruhrort, are situated on the right and left branches of the Rhine, by which river they are separated. So early as 1847 propositions were made for the construction of works to join the two lines, and in 1852, by the joint efforts of the executives of the railways, a steam ferry was established, with satisfactory results. The junctions between the ferry boats and the stations had been made in the ordinary way, with inclined planes of 1 in 10, and the shunting of the carriages and wagons between the boats and the stations was done by shunting engines which, however, did not travel on the inclined planes, but moved the trains by means of wire ropes. This system, however, was found to possess considerable disadvantages, and after various plans had been tried, with more or less success, it was finally determined to abandon the inclined plane altogether, and substitute for it between the boats and the station level a hydraulic lift.

The ferry-boat, a side-wheel steamer of 200 horse-power, with two oscillating cylinders of 46.4 in. in diameter, and 37 in. stroke, was built by Messrs. JACOBI & Co., of Sterkrade; it has a flat deck 171 ft. 6 in. long and 26 ft. 9 in. wide amidships. It carries three parallel lines of rails, which give accommodation for about twenty 10-ton goods wagons. The depth of the boat is about 9 ft., the draught of water when empty is 36 in., and when loaded 48 in. Steering apparatus is provided at both ends, and the diameter of the paddle-wheels is 14 ft. 5 in.

The lifts are placed on each side of the river, and the platform for lowering or raising the wagons, moves vertically in the tower. This platform is framed upon iron girders, and carries three lines of rail, corresponding to those on the ferry boat. The pairs of rails at the sides are 24 ft. 8 in. long, but the central pair is extended in the direction of the station to a length of 36 ft. These latter are employed for the long six-wheeled trucks, and the former for the shorter four-wheeled trucks. The platform moves in the lower part of the tower upon girders bolted to timber beams built into the brickwork. Of course the height of lift varies according to the level of the water; the platform can be lowered to the lowest level of the water, whilst its highest position is fixed by projecting beams. The longest stroke or lift of the platform is 27 ft. 6 in., but the height most commonly required varies between 13 ft. and 16 ft. The lower part of the lift tower is open on the side towards the water, and the ferry boat enters this opening, being kept in position by guide and fender piles, and being protected from injury by suitable buffers.

When the platform is fully lowered it rests upon the end of the boat, to which it is connected by means of a coupling apparatus, and the trucks are then shifted from the boat to the platform, on which they are lifted to the station level.

The platform is lifted by means of hydraulic presses, which are placed in the upper part of the tower. The main-lifting cylinder is 29.84 ft. in length, with metal 2 in. thick. This is placed in the centre of the building on wrought-iron cross girders, about 19 ft. above the station level. A plunger, 29.84 ft. long and 12 in. in diameter, works within the cylinder, and to the upper end of the piston is secured a crosshead, to which are attached, first, the guide blocks, which work against rails which are supported within the tower by timber framings; second, the two chains carrying the platform; third, two chains which are taken up to the top of the tower, and, passing over pulleys, support counterpoises weighing twenty-five tons collectively. These are employed to balance the dead weight of the piston and the platform; fourth, a chain which passes over rollers, and is connected at its other end with a second and smaller lifting cylinder, 7,48 in. diameter, and with a stroke equal to half that of the main cylinder. The chain before spoken of is not attached direct to the piston, but passes over a pulley upon it, and is then connected to the cylinder in such a way, that not only half the pressure, but the full stroke of the piston is transferred to the chains. The small cylinder is generally employed only for lifting the empty platform; but both cylinders may be employed together in case any unusually heavy load has to be lifted.

The pumps supplying the water are not placed in the tower, but in a separate engine-house at the side of the station. This engine-house contains a horizontal high-pressure engine of 38 horse-power, with two cylinders of 13.77 in. diameter. The piston-rods of these cylinders drive direct the double-acting pumps for the hydraulic presses in the lifting tower. The water, however, is not pumped direct into the water tower, but passes into an accumulator, provided with a plunger piston, from which is suspended a counterpoise consisting of an iron box filled with kentledge. The piston is 19.68 ft. long and 16.53 in. in diameter, and it exerts a pressure upon the water of 57.6 tons, or 650 lb. per square inch. The effective cubic contents of the accumulator is equal to the sum of the cubic contents of the two cylinders in the water tower. The loaded box of the accumulator piston is provided with brackets and chains, by which the safety valve is opened, and the throttle of the steam pipe closed, so soon as the piston has reversed its highest position. The engine then works very slowly without producing any further lift of the loaded box, but employs again at once its full power as soon as a portion of the water in the accumulator has been consumed. Additional pumps are provided for pumping from the well into a tank and for feeding the boilers. The pressure main passes through the lower part of the tower into a receiver with valves, from which the water is distributed as required. The receiver is made of cast-iron, and consists of tubular chambers, from which the water is carried off by four pipes, namely—first, the pressure main; second, the waste pipe leading to a small reservoir under the roof of the tower, and thence into the main reservoir of the engine-house; third, the pipe to the main cylinder; and, fourth, the pipe to the small cylinder. Each of these pipes is provided with separate valves, by means of which the required combinations are effected. There is in addition a self-acting safety-valve within the tank, which opens into the pressure main as soon as the downward motion of the platform produces in the lifting cylinder a greater pressure than exists in the main itself. Another valve, serving a similar purpose, is also placed between the distributing chamber and the main cylinder. Two other self-acting valves are also added for the purpose of filling the one cylinder with water not under pressure, while the other cylinder only is acting, so that empty spaces of vacuums are prevented.

The cost of constructing the ferry was £19,850, of which £7011 were expended on the machinery, and £11,865 for the boat. After the work had been erected, and sufficient experience had been obtained as to its satisfactory working, a second boat was constructed and put to work. This boat, which cost £11,227, gives accommodation for sixteen 10-ton wagons, and is fitted with engines of 400 horse-power.

The average work done by the ferry with one boat is sixteen wagons per hour; the time for crossing the Rhine varies from ten to fifteen minutes, according to the level of the water; the lifting velocity of the heavily-loaded platform is between 17 and 18 ft. per minute.

The greatest effective load that can be lifted is 31 tons, the pressure in the accumulator always 49 atmospheres, whatever the position of the loaded piston may be, and whether the lifting cylinders are at work or not. The pressure of the water in the lifting cylinder corresponds with the load to be lifted; it varies between 11 and 39 atmospheres for the unloaded platform, so that when loaded with 31 tons, if the platform is at the top of its lift, the pressure in the cylinder increases to 49 atmospheres.—*Engineering.*

The Siemens Furnace.

WE have persistently followed the gradual introduction of this important invention, we have published the favorable results obtained in practice by its application, and we have strongly advocated the general introduction of the Siemens furnace in all the iron-works of this country. In that sense we have shown what a correspondent calls a "decided partiality" to this furnace, and we promise to show an equally decided partiality to it, and to every other valuable improvement in modern engineering and metallurgy in the future. At the same time we cannot permit it to pass without notice that another meaning may be attached to the words used by our correspondent, this meaning implying an improper partiality exercised in suppressing facts which may be unfavorable to Mr. SIEMENS, while giving publicity only to such evidence as will speak in favor of his invention. We do not hesitate to throw the full light of public discussion upon the very shadow of such a suspicion. In looking back over the numerous pages which have been devoted to this important subject, our readers will find a record which faithfully represents all the struggles and difficulties encountered by Mr. SIEMENS, and overcome step by step in the practical application of his invention to the different processes of metallurgy. The opinions expressed by us were cautious and guarded whenever a new step was made by Mr. SIEMENS which required the verification of commercial practice before it could be accepted as an established reality. The Siemans furnace for reheating steel ingots, and for melting steel in crucibles, were the first and for some time the only applications advocated by us. Steel melting upon the open hearth, and the Siemens-Martin process in due course were recorded as successes, while the Siemens puddling furnace was treated with marked diffidence until the results of actual practice had forced upon us the conviction that in this branch, too, the practical application of this invention has become a reality, and is likely to spread with increasing rapidity. We have recorded the success of more than 2,000 Siemens furnaces now working in the iron and steel works of Europe, so far as we have witnessed and verified it, and we have not given any account of unfavorable results, simply because we have not met with a single instance of practical failure in any one of the applications in metallurgy to which the Siemens furnace has at any time been recommended by us. Our correspondents comment upon certain theoretical and practical points, in connection with this subject, which well deserve public attention. The question of waste of metal in the furnace is by far the most important element of economy in practice, and should be ventilated from all points of view. There is much force in the statement that carbonic acid is in itself an oxidizing agent, and that the atmosphere of the Siemens furnace is not perfectly neutral in consequence. Against this, however, there is much to be said. The action of carbonic acid is certainly less intense than that of free oxygen, and therefore the difference in favor of the Siemens furnace none the less a reality. There is, moreover, the power of surcharging the flame with carbonic oxide gas, the presence of which, as is now established beyond doubt by Mr. BELL'S experiments, counteracts the oxidizing influence of carbonic acid. A neutral flame, therefore, can be produced even in the sense in which the idea of neutrality is accepted by one of our correspondents, although the more correct form of nomenclature would be to call this an over-carburized flame. The publication of the results of continuous work during a long period of time would be a great desideratum, but such a record is not so easily procured. All forges do not keep a strict comparative account of those items, and some who do so with great care and precision have considerable objection to the publication of figures which are so closely related to the amounts of prime cost of manufacture. We hope, however, before long, to be in a position to place such authentic records of this kind before our readers as will amply satisfy the legitimate inquiries of all interested in this important, subject with regard to the consumption of fuel, cost of erection and maintenance, and the proportion of waste of iron and steel in heating, as found in continuous practice with the regenerative gas furnaces of Mr. SIEMENS.—*Engineering.*

Trials of English Steam Fire Engines.

THE engines were of the common types, SHAND'S being a vertical three-cylinder quick stroke engine, and MERRYWEATHER'S, a horizontal two-cylinder, with slower stroke. The novelty in both engines was a means of maintaining a supply of air to the air vessel during continuous working. In SHAND'S engine this is effected by a valve worked by hand which is connected with the air vessel, and by which any loss of air that may occur in course of working is made up. By this valve, also, air is admitted to replenish the air vessel. In MERRYWEATHER'S engine, an air valve is connected with the pump cylinder, and by an ingenious automatic arrangement it maintains a continuous supply of air to the air vessel, the valve being actuated by the water at each stroke of the pump piston. The weight of SHAND'S engine was 2 tons, 1 cwt., 2 qrs., 8 lb., and that of MERRYWEATHER'S 2 tons, 4 cwt., 3 qrs., 14 lb., the former being fitted with a brake and the latter being without one; both engines were weighed empty.

The trials commenced shortly after 12 o'clock, SHAND'S raising steam to 100 lb. in 7 minutes and 35 seconds, and MERRYWEATHER'S in 10 minutes 9 seconds, water issuing from the respective jets in 35 seconds and 38 seconds later through 120 yards of 2½ inch hose. In the first trials for height and distance through 1¼ inch nozzles the jets closely approximated, MERRYWEATHER'S jet, however, being the more compact of the two. After this the engines pumped to vertical heights through 200 yards of 2½ inch canvas hose with 1⅛ inch nozzle. In this test, MERRYWEATHER'S jet reached higher than that of SHAND'S, although the water from the latter was more compact than in the previous test. Messrs. SHAND were at the same time playing from a second jet near their engine. The canvas hose was then replaced by the same lengths of leather hose with 1⅛ inch nozzle, through which both engines played horizontally and vertically, the SHAND jet taking the lead in both cases, the horizontal deliveries reaching to about 170 feet from the nozzles. The next test was for simultaneous and intermittent working, and was intended to illustrate the rapidity with which the engines could be started and stopped. In both cases the signals were responded to with equal promptitute, the test, however, does not carry much weight with it, as it only depends upon the dexterity or clumsiness in manipulation. The last test consisted in working each engine with four jets attached to two lengths of hose with ¾ nozzles. Here both engines played equally well, very good jets being thrown to the same altitude by each. The trials were concluded at 5 o'clock after five hours of as hard working as steam fire engines were ever put to. The pressures reached were higher than have been attained on any previous occasion. At the close of the trials the consumption of fuel by each engine was reported by Mr. ARMYTGE, the borough surveyor, to have been as follows: SHAND, coal, 13 cwt.; wood, 92 lb.; shavings, 20 lb. MERRYWEATHER, coal, 18 cwt.; wood, 56 lb.; shavings, 30 lb. A committee of six local mechanical engineers was appointed by the municipal authorities of Preston to watch and report upon the trials, and they met the municipal committee on Wednesday last, but no decision was arrived at, and the reports are to be further considered.—*Engineering.*

Burnt Iron and Burnt Steel.

Extracts from a paper read before the Chemical Society recently by Mr. MATTHEU WILLIAMS.

AFTER quoting the attempts already made to explain the chemistry of "burnt" iron and "burnt" steel, Mr. WILLIAMS referred to the practical importance of obtaining some laboratory method of readily determining whether the brittleness or rottenness of a given sample of manufactured iron was due to original impurities of the raw material or to the fault of the workman who had burnt the iron in forging it. The conflicting and unsatisfactory theories of the chemistry of the changes effected in burning at first stood in the way of his attempts to solve this problem, when an accident revealed the true theory, and at the same time suggested the desired practical test.

Two samples of borings, marked "Steel A" and "Steel B," were sent to him to analyse, but he found that one of them contained no carbon and the other a mere trace; that consequently they were not steel, but both were iron. A difference in the behavior of the samples when the acid solvent (nitric acid diluted to the specific gravity of one-half,) was first applied was observed. Sample A rendered the acid dark-colored and turbid; sample B presented the usual appearance of good iron in the course of solution. The darkness or turbidity of A disappeared when the solution was complete, and no insoluble residue was left behind. Further examination proved that the peculiar appearances presented by A were due to the presence of minute particles of oxide of iron intermingled throughout the sample; and upon further inquiry it was ascertained that the marking of the samples as "steel" was merely a trick of an over-sharp, excessively "practical" man, who thought the chemist could not distinguish borings or filings of steel from borings or filings of iron. Sample A was from one side of an armor plate which had been burnt, and B was from the opposite side of the same plate, but which had escaped the burning. Further experiments were made with samples of burnt iron of different degrees of rottenness, ranging from barely-damaged specimens to the extreme case of burning presented by the contents of the Bessemer converter before the speigeleisen is added. In all these free oxide of iron was found not merely on the surface, but *diffused more or less completely throughout the substance of the iron.* It was further found that the simple test of adding borings of such iron to nitric acid of specific gravity one-half affords, after a little practice in recognizing the peculiar appearance presented by the suspended black particles that are suspended by the effervescence, a reliable and very ready and rapid

method of detecting the burnt iron, as the silicon and graphite of cast-iron or pig-iron produce a turbidity and darkness which may be mistaken for the appearance due to oxide. The dark color produced by the combined carbon of steel is distinguishable by its permanency. Burnt steel was next examined. This presented no indications of the presence of free oxide, as was theoretically expected; previous observations and experiments having shown that the presence of combined carbon protects iron from oxidation by heat.

What, then, is the action of burning in the case of steel? Mr. WILLIAMS described a number of experiments wherein he subjected bars and plates of steel of known composition to the action of furnace heat, for periods varying from a few hours to four days, and found that in every case the quantity of carbon was diminished in proportion to the period and severity of the exposure; that this removal of carbon was not confined to the surface, but, in lesser degree, it occurred throughout the substance of the steel. When steel was burnt there was always a loss of carbon.

From these facts he inferred that the damage done to steel by burning is due to the oxidation of the carbon. It is well known to practical men that when steel is thus burnt, by raising it to a yellow or white heat, and then suddenly cooling it, the "grain" exhibited by fracture is much coarser than in another piece of the same bar which has only been moderately heated. This coarse grain is usually called crystalline; but Mr. WILLIAMS controverted this idea of crystallization, as the facets of the grains, when examined with a hand magnifier, exhibit concave and convex faces, rather than the plane surfaces characteristic of crystallization. He suggested that the structure of burnt steel would be more correctly described as "spongy" than as crystalline, and he attributed this spongy structure to the evolution or suppressed occlusion of carbonic oxide, and possibly of oxygen also, which have been suddenly arrested in their passage through the metal, and thus existed as minute bubbles in the steel.

To those who are unacquainted with the researches of DEVILLE, TROOST, and GRAHAM, this idea of oxygen penetrating the substance of solid bars of iron and steel, and oxidizing the iron or carbon of their interior, may appear rather startling; that the researches of the above-named philosophers have proved conclusively that gases pass through highly-heated iron and steel with a facility which may be rudely compared to the passage of water through blotting paper; that certain gases become "occluded," or hidden, in wondrous quantities within these and other metals, and there retained in mysterious imprisonment, to be again set free under varying conditions of temperature and pressure. This being the case, the difficulty of conceiving the internal oxidation of iron and carbon, and the internal formation of carbonic oxide, is removed. When the steel is highly heated, and the oxidation of its carbon, and the consequent evolution of carbonic oxide is rapidly proceeding, it is easy to conceive that a sudden suppression of this action, by plunging the steel in water, may fix the gases in the act of passage; and, while still in the gaseous condition, this would produce the spongy state, and exhibit the concave faces of the minute air-bubble cavities.

The paper concluded with a promise of further communications to the Society on the subject of the so-called "crystalline" and "fibrous" structure of iron, the writer regarding the appearance and mechanical peculiarities usually ascribed to crystalline as the result oi the occlusion, exclusion, endosmosis, and exosmosis of gases in the metal, and its consequent spongy structure; and the "fibrous structure of iron to the rolling down or consolidation of this spongy structure, and the welding up of its pores.—*Ryland's Iron Trade Circular.*

MINING SUMMARY.

Idaho.

REVIEW OF MINING AFFAIRS.

The Silver City *Avalanche* of April 22, thus reviews mining matters:—On account of the breaking up of the roads and scarcity of wood at the mills, mining operations at present are somewhat retarded. But this state of things will not long continue, as in a month, at least, the roads will be in good condition for hauling with wagons. Owners of placer mines are ready, waiting for water, and in a few more warm days, placer mining will be in full blast. Jacob's gulch, Blue gulch, Slaughterhouse gulch, the Wagontown diggings, and other placers that will be worked, will afford employment for all the surplus men in camp, and the yield of gold dust will be considerably greater this season than it has been for years. Parties are setting sluices and getting ready to work the Golden Chariot dump, and W. H. FRAZER & Co. have everything in readiness for commencing operations on the dump of the Ida Elmore. The BRUCE BROS. are also making a string of sluice boxes, and, as soon as the water starts, will resume work on the Oro Fino dump, which they partially worked last spring. We look forward to unprecedented activity in quartz mining here this summer. New mines will be developed, and operations will be energetically resumed on some that have remained idle for years. There are scores of mines here that, if properly and legitimately worked, would prove Owyhee to be what we have always maintained, one of the best, if not the very best quartz camp on the Pacific coast. In this opinion we are not alone, as witness the many who, after vainly endeavoring during the last year to find a better place, have returned, better than ever satisfied to remain. These mines are being worked more or less at present, viz:—Golden Chariot, Ida Elmore, Oro Fino, Bismark, Belle Peck, Illinois Central, Skookum, Empire, Chipmunk, Peck & Porter, and Red Mountain. Considerable work will be done in Flint this year. Mr. BLACK has returned from Virginia City, Nev., and will soon start up his mill on Pioneer ore. C. S. MILLER is also about starting the Rising Star Mill. Last year Flint District produced more bullion, according to the population, than any other camp on the coast, and from present prospects, it will undoubtedly sustain that reputation this season. The Golden Chariot receipts at the office in San Francisco for March were $72,294 03. The total amount of Chariot dividends has been $350,000, and no assessments have ever been levied. WELLS, FARGO & Co. shipped from here, during the past week, eight bars of bullion, valued at $21,730 00.

We gather the following from the *World* of April 6:—After a long and severe winter, winding up several weeks of variable weather, spring is at length ushered in. Large volums of water are running to waste in More and Elk creeks, and the roads leading out of our city are becoming not far from impassable for wheeled vehicles. Water has been turned into two or three of the ditches belonging to the Buena Vista Bar Company, from one of which they have for nearly a week past been supplying water to a company of Chinamen, who are at work on the bar opposite the jail. The Buena Vista Company intend starting their hydraulics on Bonum hill this morning, and in a week from this time mining operations will be in full blast all around Idaho City. Efforts are being made to get water through the Big Ditch at the earliest day possible, and in the Alderson and Dunn ditches the water is already running. Within two weeks all the principal companies in the camp will be at work and our city, at night, will be illuminated by the pitchwood fires of the miners, on the bars, hills and gulches for miles around. From Mr. JAMES CARR of Quartzburg, who called on us Wednesday last, we learn that the Gold Hill mill started up last Monday and that it runs like clock-work. The company have over 3,000 tons of ore ready to crush, and are still taking out more. * * * MR. EISSLER has men engaged in driving the tunnel into his ledge near the Gold Hill, and quartz is looking up in that section.

Montana.

Correspondence of the Virginia City *Montanian* gives the following items of news from Silver Star, April 25: "Messrs. WILSON & COWAN are running a tunnel in on an extension of the Clipper, and are getting some tolerably fine quartz. HARPER is working away on the Iron Rod, and intends soon to erect a mill on Hill's cañon. The Everett-Green Campbell mill is running day and night, with a large amount of ore on hand. MADDOX & SEACHRIST are working upon a couple of lodes which promise very favorably. CARTER & HAYDEN have leased a portion of their ground and are running a tunnel to strike their ledge at a greater depth. The enterprising firm of TRIPP & AINSLIE are making fine progress in erecting their mill; they expect to have it running in ten days at farthest. It is substantially built."

THE UNIONVILLE MINES.

The Helena *Gazette*, April 17, makes a favorable report of mining affairs at Unionville. It says: All the mills are running, and the Excelsior on Grizzly will be in two or three days. The Whitlatch mill is idle on account of pending negotiations and settlement of some conflicting interests. Turnley's mill we did not visit, but were assured that the Park lode, which furnishes rock for this mill, was producing very rich ores. The Philadelphia mill appears to be idle for want of rock, the owners not having interests in lodes which are developed. We saw sufficient evidence of future prosperity at Unionville to warrant us in giving encouragment to all interested.

GOLD CREEK.

A writer in the same paper gives an account of affairs at the Gold Creek mines. The Bratton Bar Co., of Pioneer City, have been working since April 1st. The Rock Creek Ditch Co., are rapidly preparing their ditch, and will be ready to furnish water by the 15th. The snow in the Gold Creek mountains is melting rapidly, but one great consolation left the miner is, there is plenty of it. Buildings are going up as fast as possible, especially at Pike's Peak and Pilgrim Bar, which latter town is called Yam Hill, and will eventually be the leading town of Gold Creek, it is so convenient to the diggings. They have at present a hotel, two saloons, and several private dwellings, with a store in course of construction. The only drawback will be a lack of water in the winter, but the boys can bear with this obstacle, when it promised to be a lucrative camp while water does run.

CLARK FORK MINES.

BURT HENDERSON, an old experienced gold hunter, is favorably impressed with the appearance of the upper Clark's Fork country, and believes there will be mines found there. He obtained *encouraging* prospects. He has struck no diggings as yet. Along the Yellowstone, from the cañon up to Bear Gulch, there are some two hundred men, who propose going toward Clark's Fork prospecting, as soon as the mountains are passable. So says the *New Northwest.*

California.

A NEW TUNNELLING MACHINE.

Col. VON SCHMIDT, of San Francisco, has invented a machine for tunnel-boring; a machine which is intended to meet the requirements of the latest scheme extant, the Tahoe water project. According to the *Bulletin*, the machine is constructed upon the Severance diamond drill principle, but in the mode of application the machine differs materially from all others now in use. The Von Schmidt drill—the Colonel, with characteristic modesty, has not given the machine a name—will consist of a circular wheel, eight feet in diameter. Imbedded in the rim of the wheel, each revolving on its own account, will be twenty-four diamond drills, one foot apart. In the center of the wheel, according to the model, is a single drill—and this is kept one foot in advance of the other drills. The wheel is calculated to make 800 revolutions per minute, the drills revolving at a higher rate of speed. The periphery of the tunnel will be on the scale of eight feet; the groove cut by the drills will be two inches wide and three feet deep. It is intended to load the center hole alone, then run the machine back on the track, and raise the lower half of the wheel on hinges. The blast is fired, and the great cheese of rock crumbles in pieces. The machine is constructed so as to admit of three feet space inside the wheels, between its frame-work and the bed of the tunnel, thus giving facilities for removing the debris afforded by an inner car track. The machine will be driven by compressed air. With the aid of the machine Colonel VON SCHMIDT is of the opinion that he can complete the Lake Tahoe tunnel within two years. A working model of this combination drill will be forwarded to Washington in a few days.

Nevada.

MOUNTAIN CITY.

A correspondent of the Elko *Independent*, writing from Mountain City, April 18th, says: "Most of the mines have been idle the past winter until within the last month or so; but they are now being worked energetically, the weather not being bad enough to offer any serious interruption. As work progresses in the mines, most of them improve steadily, and many are turning out better than the most sanguine anticipated. Among the most promising of the new mines is the El Dorado, owned by WILSON HAYS and J. D. NEVER, which was located eighteen months since by other parties, who did not consider it hardly worth working. The present owners, however, took hold of it, and after sinking thirty feet, have struck a splendid body of ore, the ledge being over three feet wide. The last crushing, by wet process, returned $150 per ton. The U. S. Grant ledge, owned by R. HUTCHINSON & Co., is small, but increases in size as it goes down. It promises well, and is extremely rich. An incline shaft has been sunk fifty feet, and another started eighty feet north, for prospecting. The last crushing of a small lot at Davis' mill worked $230 per ton. If the owners of this mine had the means to open it in the proper manner, they would doubtless realize handsomely from it. DAVIS & FULLER'S mill is steadily employed in working ore that requires roasting, and Norton's mill is working free ore from the Argenta."

BUTTE MILL, RYE PATCH.

From a gentleman of this place, says the *Silver State*, we learn that about ten days since the Butte Mill, in Rye Patch, after a cessation of operations for about a month, resumed, with an increase of five stamps—making ten now in use. The furnace, of Akin's patent, was also overhauled and many decided improvements made in its general working. The entire works are said to fully reach the anticipations of the owners, and skilled workmen employed in performing the work recently done. We are told that the furnace, especially, works beautifully, and bids fair to become of great benefit to this State, in the cheapness, cost and success of treating ores.

STATE MINERALOGIST.

MR. HENRY R. WHITEHILL, State Mineralogist of Nevada, left us, says the *State Register*, a few days since for Los Angeles, California, where he intends fitting out and coming up through this State from the southern line. He will probably strike across the Sierra Nevada range to the head of the Mohave river, thence via the celebrated "lost mine," made memorable by Breyfogle's researches, to Potosi in the Timber mountains, thence via Las Vegos and the valley of the Muddy to Pahranagat and Pioche.

Pennsylvania.

A VISIT TO THE NESQUEHONING TUNNEL.

A correspondent of the Philadelphia *Evening Bulletin* thus writes from Summit Hill, Pa., April 27, 1871: This tunnel, which is being driven for the purpose of doing away with the Switchback railroad, is a continuation of the old tunnel at this place known as No. 7, and when completed will be nearly a mile in length. It was decided by the Lehigh Coal and Navigation Company that the situation was the most central and desirable, and the old tunnel being already driven 1,500 feet to the Mammoth or E vein, made a considerable lessening of the distance to be cut through. Although the name of this tunnel is but seldom mentioned compared to either the Mont Cenis or the Hoosac, yet it has been said by engineers of celebrity that if a person is desirous of seeing the science of tunnelling illustrated, with regard to economy, speed and durability, he should not go to either of the above mentioned workings, but should proceed to the Nesquehoning tunnel, where he will see the most desirable drills, the most accurate engineering, and the most careful superintendence. At the commencement of the work the drilling was performed by hand, but when the Burleigh drills were brough forward they were adopted, after some consideration, and went into operation in March, 1870, and have been employed since, giving much satisfaction. The tunnel is driven through the coal measures, cutting each vein known at this locality; after passing through them it penetrates an intensely hard conglomerate, leaving which it enters the red shale. A condensed description of the Burleigh drills might not be misplaced here. These drills are worked by condensed air, which is pumped by six twenty-horse-power steam engines into a large sheet-iron receiver, from which it enters the tunnel through a six-inch cast-iron pipe, and is distributed by means of hose to the three carriages which support the drills. These three carriages are used for the heading—the first and second enlargements. The heading carriage supports five drills, the first and second enlargements each having three. The motion is given to the drills by the action of the condensed air in the cylinder, the piston of which is connected directly with the drill. A three-inch hole in sandstone has been made five feet deep in eleven minutes, and its average progress in conglomerate rock is seven feet per hour. The heading is now in the red shale, and is proceeding at the rate of thirty-five feet per week. The boiler and blowing engines are erected at the north portal of the tunnel, and are in readiness for starting. When under full headway about sixty feet per week will be made, and at that rate the two headings will meet in September. The enlargements will follow closely, and it is expected that cars will pass through by January, 1872.

Colorado.

We learn from the Georgetown *Miner*, April 27th, of the contemplated arrival at that place in a few days of Col. WILLIAM M. CHANDLER, of the Boston Silver Mining Association, who will take immediate steps to erect reduction works of large capacity, for the treatment of silver ores by chloridizing and amalgamating, at St. John's, Shake River district, in Summit county. The Association have been mining for several years on the Comstock lode in the above district, and they have a large amount of ore out, awaiting treatment, and also probably one of the best opened mine in the Territory

THE BURLEIGH TUNNEL.

The successful completion of the Burleigh Tunnel, has had the effect of inspiring greater confidence in mining matters.

THE AREY FURNACE.

We also learn from the *Miner* that the necessary feeding machinery for the Arey furnace at the Stewart mill has not yet arrived, and that no test has yet been made. The draft has been regulated and now works well. Sixty days will probably elapse before the necessary machinery, elevators, etc., can be completed, and the furnace enter upon active work, although probably before that time its practicability will be demonstrated.

LAKE COUNTY, MINN.

From Lake county we learn that the valley of the Arkansas and the surrounding mountains are almost destitute of snow. The Cache Creek mines will probably remain idle during the coming season, for want of water, while the supply in California Gulch being limited, will cause an early suspension. The gold yield of the country, however, will not be less than for the year 1870, owing to the number of free gold lodes recently discovered, which are new being worked. There is one commendable feature about the working of some of the lodes in California Gulch, to which says the Colorado *Miner*, we would call the attention of miners in other parts of the Territory. The owners of the Great Eastern lode, in California Gulch, are poor men, and one or two of the party work in other mines to furnish the money necessary to keep their partners at work on their own property. Such a course as this almost insures success, and if this mode of doing business was more common in Summit, Park and Lake counties, there would be a much larger number of paying lodes worked in those localities than there now is. Co-operation is sometimes the only way by which poor men can mine on lodes.

MARKET REVIEW.

The Coal Trade.

NEW YORK, May 5, 1871.

Negotiations continue in the various coal districts, towards a settlement of existing difficulties, and, we are happy to say, with some prospect of a good result. The Wilkesbarre Coal & Iron Company have, through their President, Mr. CHARLES PARRISH, succeeded in getting their men to adopt their proposition which we published in full last week, and the men resumed labor yesterday. Mr. SWOYER, a lump operator in the immediate vicinity, has also been able to compromise with his workmen. We hear also of several other smaller operators having agreed upon same terms with their men. Hence we are in a fair way for a supply of coal.

The market became greatly excited by the news of the resumption of work by the Wilkesbarre Company, and Trinity Building and other headquarters of coal dealers gave evidence of preparations for increased business. The following circular from the Wilkesbarre Company fell like a bomb-shell in the midst of the quiet camp, and created no little consternation among all connected with the trade as well as stirring up our Cumberland coal dealers, who, in consequence of the high prices of anthracite, were having everything pretty much their own way.

"OFFICE OF THE WILKESBARRE COAL AND IRON COMPANY, 80 BROADWAY.

"NEW YORK, May 1, 1871.

"WILKESBARRE COAL.

"For the present the following prices are fixed for this Company's Coal, delivered at Hoboken, or Port Johnston, N. J.

"The Company reserves the right to change same, at any time, except on contracts made prior to such variation.

"All sales subject to our printed conditions.

Lump,	$6 00	Egg,	$6 35
Steamer,	6 00	Stove,	6 75
Broken,	6 25	Chestnut,	6 00

"Every contract for the delivery of Coal must stand upon its own merits as regards price, terms and conditions of sale.

"JNO. F. WILSON, Sales Agent."

The public was not prepared for such low rates, and were taken completely by surprise, but every intelligent dealer will see that low prices at the opening of trade is the only sound policy to pursue. We are only sorry that the price was not fixed at the minimum at which the company can afford to produce and sell coal. A special contract with the transportation company exempts them from the high rates of tolls charged to other parties, and stove coal might as well have been offered at $5 75 as $6 75. This could as well be done this week, as thirty days from now, when this will surely be the price if all the regions get to work in the meantime, which now seems very probable. Retailers are willing to lay in their supply of coal during May, June and July, provided the price will guarantee them no loss. With coal at $5 75 at Hoboken a dealer can deliver coal to the consumer at from $7 to $7 50, which is about the price that the public is willing to pay for it for future uses. In the contrary if the price is from $8 to $8 50 he will economise and buy a ton at a time. It makes the greatest difference in the world to the trade whether the coal is taken at this time of the year, as fast as it comes to market, or is allowed to accumulate. In the first instance the market is kept clear and steady prices are the rule. In the second a glut is sure to take place, and prices fall below a minimum cost of production which, in turn, leads to strikes. It is therefore apparent that the lowest rates should mark the opening of trade, and while we do not want to find fault with one who has done us a kind act by bringing down stove coal from $9 to $6 75, yet we wish he had started the ball at a lower figure, in order that the trade for the balance of the year may not be marred by suspension and strikes.

Other dealers quickly follow in the wake of the Wilkesbarre company with low prices. SAMUEL BUNNELL, Jr., offers his celebrated Wyoming Valley coal at—Lump and Steamer, $6: Broken, $6 25; Egg, $6 35; Stove, $6 75; Chestnut, $6.

Messrs. WHITE, FOWLER & SNOW offer their excellent Wilkesbarre and Wyoming coals at $6 for Lump; $6 25 for Broken; $6 35 for Egg; $6 75 for Stove; $6 for Chestnut, on board vessels at Port Johnston, N. J.

There is no large quantity of coal coming to market as yet in consequence of the resumption of operations, but orders are freely taken to arrive.

Freights remain unchanged. A few weeks, however, of active business will soon make vessels scarce, and rates will advance a trifle.

Cumberland coal retains its hold well upon the consumer, and we hear of large transactions in it. It is gratifying to know that manufacturers, steamers, and others who appreciate the value of a first-class steam generator, have been so ready to adopt the Cumberland coals. These coals are offered in the market to-day at $6 50 from schooners hoisted on rail of steamer or delivered in carts—$7 alongside in barges.

Pennsylvania Coal Company,

Shipments of Pittston Coal for the week ending April 29, 1871.

	1871.		1870.	
	WEEK.	YEAR.	WEEK.	YEAR.
By Railway...	— —	3,566 08	28,117 09	326,404 11
" Canal.....	— —	— —	353 14	1,539 03
Total	— —	3,566 08	28,471 03	3,7,943 14

Decrease 324,377 06 tons.

Anthracite Coal Trade for 1870 and 1871.

The following table exhibits the quantity of Anthracite Coal passing over the following routes of transportation for the week ending April 29, 1871, compared with week ending April 30, 1870.

COMPANIES.	1870. WEEK.	1870. TOTAL.	1871. WEEK.	1871. TOTAL.
*Phila & Reading R. R.	27,062	842 053	15,350	672,546
†Schuylkill Canal	1,415	55,598	9,299	60,947
Lehigh Valley R. R.	79,029	1,049,970	13,316	444,806
Lehigh & Sus. R. R....	23,934	284,000	15,145	133,834
Lehigh Canal.....	5,963	29,912	1,393	2,762
Scranton North.....	13,236	203,786	....	....
" South.....	40,600	558,902	....	....
Penn. Coal Co., rail....	28,117	326,404	....	3,566
" " " canal..	353	1,539	....	....
Del. & Hud. Canal Co..	56,421	168,608	....	4,050
" " East.....	5,334	154,927	393	62,537
" " West	1,145	28,744	....	12,750
South.....	12,645	98,587	....	....
Shamokin.....	6,922	92,936	23,808	159,173
Trevorton.....	2,921	77,926	....	....
Lykens Valley Coal Co..	384	712	2,245	20,961
Wyoming South.....	7,121	7,661	....	....
Wyoming North.....	....	....	....	....
P. N. Y. C. & R. R. Co.	....	99,476	5	35,318
Williamstown Co'y....	6,635	81,289	....	....
Big Lick Col....	1,871	5,818	3,636	37,758
Total.....	320,739	4,169,238	84,589	1,675,618
1870.....	84,589	1,678,618		
Decrease week and yea	236,150	2,509,620		

*Less coal transported for Company's use and Bituminous coal.

†Closed for the season.

Bituminous Coal Trade, 1870 and 1871.

The following table exhibits the quantity of Bituminous Coal passing over the following routes of Transportation for the week ending April 29, 1871, compared with week ending April 30, 1870.

COMPANIES.	1870. Week.	1870. Year.	1871. Week.	1871. Year.
B. & O. R. R.....	21,493	231,660	30 905	344,041
C. & O. Canal.....	19,820	66 049	20,869	128,117
{Cumberl'd Branch	3 858	23,104	1,809	24,250
" Canal.	3 667	14,834	6,200	39,459
H. & B. T. R. R.....	8,147	89,763	10,675	111,621
Harrisburg & D.....	15,477	181,259	29,511	233,959
L. V. R. R.....	....	5,156	....	23,325
P. & N.Y.C. & R. Co.	5,130	66,658	6,063	93,284
Total.....	77,592	677,883	105,732	998,047
			77,592	677,883
			28,140	320,164

Philadelphia & Reading Railroad and Branches.

COAL TONNAGE

For the Week ending Saturday, April 29, 1871.

BY RAILROAD—ANTHRACITE.

PASSING OVER MAIN LINE AND LEB VAL. BRANCH.

	Tons.	Cwt.
From St. Clair.		
" Port Carbon.		2,023 00
" Pottsville.		61 07
" Schuylkill Haven.		1,345 11
" Pine Grove.		1,520 06
" Tamaqua.		9,170 15
" Harrisburg.		
" Dauphin.		8,790 18
Total		22,911 12

FOR SHIPMENT BY CANAL.

Passing Frackville Scales		455 03
" Mill Creek "		1,470 18
" Schuylkill Valley Scales		916 06
" Mt. Carbon "		1,345 11
" Cressona "		2,572 05
" Pine Grove "		
" Tamaqua "		5,518 05
Total		10,932 17

SHIPPED WESTWARD VIA NORTHERN CENTRAL RAILROAD.

Passing Locust Gap.		4,751 11
" Shamokin.		10,493 15
" Herndon.		
Total		15,245 06

SHIPPED WEST OR SOUTH FROM PINE GROVE.

Via Schuylkill & Susquehanna R. R.		895 11
" Lebanon & Pine Grove Branch		285 08
Total		1,180 19

CONSUMED ON LATERALS.

From Frackville Scales.		4 10
" Mill Creek "		176 00
" Schuylkill Valley Scales.		939 11
" Mt. Carbon "		604 09
" Cressona "		124 17
" Pine Grove "		36 02
" Tamaqua "		786 07
Total		2,671 16

LEHIGH AND WYOMING COAL.

Received via Allentown, E. Penn'a Br.		10 17
" " Alburtis, " "		
" " Oreland, G. & N. Br.		45 16
" " Connecting R. R.		
" " Willow Street R. R.		18 08
Total		75 01

BITUMINOUS.

From Harrisburg.		20,720 17
" Connecting R. R., G. & N. Br.		
" Junction R. R.		10 00
Total		20,730 17

COAL FOR COMPANY'S USE.

Anthracite		5,642 12
Bituminous		366 09
Total.		6,009 01

RECAPITULATION.

	Total for Week.	Corresponding week last Year.	
Passing over Main Line and Leb. Val Branch	22,911 12	31,312 19	d 8,401 07
For Shipment by Canal	10,932 17	2,367 03	i 8,565 14
Shipped Westward via Northern Central R. R.	15,245 06	1,816 17	i 13,428 09
Shipped West or South from Pine Grove	1,180 19	205 14	i 975 05
Consumed on Laterals	2,671 16	2,295 02	d 223 06
Lehigh and Wyoming Coal	75 01	6,854 19	d 6,779 18
Total Anthracite paying fr'gt	53,017 11	45,452 14	i 7,564 17
Bituminous	20,730 17	10,080 13	i10,650 04
Total of all kinds paying fr'gt	73,748 08	55,533 07	i 18,215 01
Coal for Company's use	6,009 01	4,200 14	i 1,808 07
Total Tonnage for Week	79,757 09	59,734 01	i20,023 08
Since Dec. 1, 1870	1073430 06	1199630 02	d126,49 16
Total to date	1153187 15	1259421 03	d105236 08

SHIPPED BY CANAL.

	Total for Week.	Corresponding week last Year.	
From Schuylkill Haven	5,415 00	1,608 10	i 3,806 10
" Port Clinton	3,884 00		i 3,884 00
Total Tonnage per Week	9,299 00	1,608 10	i 7,690 10
Since Dec. 1, 1870	60,648 12	54,349 03	i 6,299 09
Total to date	69,947 12	55,957 13	i 13,989 19

Delaware and Hudson Canal Company.

The following is a statement of Coal transported by the Delaware and Hudson Canal Co., for the week ending April 29, 1871.

	WEEK.	SEASON.
By Del. and Hud. Canal,		4,660 00
By Railroad East,	393 00	82,537 03
" West,		12,720 00
" South		
TOTAL TONS,	393 00	99,917 00
For the same period last year.		
By Del. and Hud. Canal,	56,421 00	168,608 00
By Railroad East,	5,334 99	154,927 00
" West,	1,145 00	28,744 00
" South,	12,045 00	98,557 00
TOTAL TONS,	76,545 00	450,836 00

Philadelphia and Reading R. R.

Amount of coal transported on the Philadelphia and Reading Railroad during the week ending Saturday, April 29, 1871:

From St. Clair	2,023 00
" Port Carbon	61 07
" Pottsville	1,345 11
" Schuylkill Haven	2,739 05
" Auburn	9,170 15
" Port Clinton	10 17
" Allentown and Alburtis	29,511 15
" Harrisburgh and Dauphin	
Total paying freight	44,86 2 05
Coal for Company's use	6,0.9 01
Total for week	50,871 05
Previously this year	833,981 15
Total	884,853 04
To same time last year	1,089,235 01

Schuylkill Canal.

Report of coal transported over the Schuylkill Canal for the week ending Saturday, April 29, 1871.

	Tons.	Cwt.
From Port Carbon		
" Pottsville		
" Schuylkill Haven	5,415	00
" Port Clinton	3,884	00
Total for week	9,299	00
Previously this year	60,648	12
Total	69,947	12
To same time last year	55,588	13

Statement of Coal Transported over Cumberland and Pennsylvania Railroad

During the week ending Saturday April 29, and during the year 1871, compared with the corresponding period of 1870.

WEEK.

	To C. & O. Canal. Tons.	Cwt.	To B.&O.R.R. Co Tons.	Cwt.	Total. Tons.	Cwt.
1871.....	20,869	09	30,905	16	51,775	05
1870.....	19,820	09	21,493	06	41,313	15
Increase.	1,049	00	9,412	10	10,461	10
Decrease						

YEAR.

1871.....	128,117	01	344 041	14	472,158	15
1870.....	66,049	07	231,060	00	297,109	07
Increase.	62,067	14	114,9.1	14	175,049	08
Decrease						

Cumberland Branch.

WEEK.

1871.....	6,201	14	1,809	14	8 011	08
1870.....	3,667	06	3,858	16	7,525	02
Increase.	2,534	08			485	06
Decrease			2049	02		

YEAR.

1871.....	39,459	05	24,250	03	63,709	08
1870.....	14,834	04	23,104	15	37,938	19
Increase.	24,625	01	1,145	08	25,770	09
Decrease						

Report of Coal Transported over Lehigh Valley Railroad

Report of coal tonnage for the week ending April 29, 1871, and previously this season, compared with same time last year:

WHERE SHIPPED FROM.	WEEK. Tons.	Cwt.	TOTAL Tons.	Cwt
Total Wyoming	1,490	04	74,972	05
" Hazleton	1,595	16	217,627	13
" Upper Lehigh			442	06
" Beaver Meadow			75,248	15
" Mahanoy	11,339	09	143,262	02
" Mauch Chunk	28	08	2,194	11
Total Anthracite	14,453	17	513,747	12
Bituminous Coal from all sources			23,325	00
Total by rail and canal	14,453	17	537,072	12
Same time last year	91,764	03	1,286,3.7	14
Decrease	77,310	06	669,2.5	02
Forwarded East from Mauch Chunk by rail	13,316	18	444,806	15
Same time last year	79,020	12	1,049,970	15
Decrease	65,703	14	605,164	02

RECAPITULATION.

Forwarded East from Mauch Chunk by rail	13,316	18	444,806	15
To N. C. R. R., at Mount Carmel			18	00
Forwarded North from L. & B. Junction	223	08	35,522	10
To L. & S. R. R. at Packerton for rail	114	10	2,428	00
Delivered at M'h Chunk			393	15
Delivered on line of road above Mauch Chunk	36	00	3,733	12
Delivered above Mauch Chunk for use of L. V. R.R.	666	08	16,811	06
To L. & S. R. R., at Penn Hav., for railroad			94	10
Do. for canal	96	04	7,193	05
At M. Chunk for canal			2,745	19
Total Anthracite	14,453	17	513,747	12
Bituminous Coal			23,325	00
Total all kinds	14,453	17	537,072	12

Report of Coal Transported by the Lehigh Coal and Nav. Co.'s Railroads and Canals,

Week ending April 29, 1871-Compared with same time last year.

WHERE SHIPPED FROM	WEEK 1871., tons	cwt.	WEEK 1870. tons	cwt.	YEAR 1871 tons	cwt.	YEAR 1870. tons	cwt.
Wyoming Region	17566	01	29771	10	129769	02	304447	08
Upper Lehigh Region			2406	03	4614	06	29084	01
Beaver Meadow Region			1013	13			7645	15
Hazleton Region	128	12	4335	06	1255	10	15347	06
Mahanoy Region								
Trescow Region					1043	03		
Mauch Chunk Region	404	12			26758	16	30089	18
Totals	18099	05	37526	12	157440	17	386614	08
Increase								
Decrease	19427	07			229173	11		
DISTRIBUTION.								
Forwarded East of Mch Chunk by Rail	15145	15	23924	16	23834	05	284000	19
Forwarded East of Mch Chunk by Canal	1393	06	5963	07	2762	08	29912	16
Delivered at and above Mauch Chunk	1507	07	579	15	18167	05	12168	08
Delivered to L. & B. R. R. at PlymouthBridge			6492	12			51293	08
L. V. R. R. at Packer'n	52	15	566	02	2677	01	9234	17
Totals	18099	05	37526	12	157440	17	386614	08
Of the above there was transported on acc'nt of L. C. & N. Co.	404	12	963	00	21995	03	30089	18
W.-B. C. & I. Co.	16,26	19	12277	10	106554	08	104206	02
Totals	16631	11	13240	10	128549	11	134296	00
Increase	3391	01						
Decrease					5746	09		

Report of Coal forwarded by Pa. & N. Y.

R. R. Co., for week ending April 29, 1871.

	BITUMINOUS. Tons.	Cwt.	ANTHRACITE. Tons.	Cwt.
By Rail	6,063	17	5	00
Previously this year	87,221	02	35,343	16
Total by Rail	.....		.....	
By Canal	.....		.....	
Previously this year	.....		.....	
Total by Canal	.....		.....	
Total for the year	93,284	19	35,348	16
To the same time last year	66,658	00	99,476	05
Increase	26,626	19	d64,127	09

Prices of Coal by the Cargo.

[CORRECTED WEEKLY.]

	AT NEW YORK, May 9. R. A.	W. A.	AT PHILADELPHIA. May 9. R. A.	W. A.
SCHUYLKILL.				
Lump	$— —	$— —	— —	— —
Steamer	— —	— —	— —	— —
Broken	7 75	— —	— —	— to —
Egg	8 75 to 8 25	— to —	— —	— to —
Stove	8 75 to 9 00	— —	— —	— to —
Chestnut	8 00 to —	— —	— —	— to —
Pea	— —	— —	— —	— —
LEHIGH.				
Lump, (along side)	— —	— —	— —	— —
Broken	— —	— —	— —	— —
Egg	9 00	9 00	— —	— —
Stove	10 25	10 50	— —	— —
Chestnut	9 00	— —	— —	— —
Pea	— —	— —	— —	— —
SPECIAL COALS.*				
Diamond Vein	R. A.	8 00	— —	— —
New England	"	— —	— —	— —
Locust Dale	W. A.	8 50	— —	— —
Honey Brook, Leh	W. A.	9 00 to 10 50	— —	— —
Spring Mountain	"	9 00 to 10 50	— —	— —
Sugar Creek	" "	9 00 to 10 50	— —	— —
Sugar Loaf	" "	9 00 to 10 50	— —	— —
Old Comp'y's	" "	9 00 to 10 50	— —	— —
Cross Creek	" "	9.00 to 10 50	— —	— —
Room Run	" "	— —	— —	— —
Girardville	" "	— —	— —	— —
McMichael	" "	9 50	— —	— —
Shamokin	" "	— —	— —	— —
Lykens Valley	" "	9 50	— —	— —
Broad Top	" "	9 50	— —	— —
Hill & Harris	" "	— —	— —	— —
Henry Clay	" "	— —	— —	— —
Powelton	"	9 50	— —	— —

*Dealers in these coals may be found in our advertising columns.

Company Coals.

May, 1871.

No quotations during strike.

	L.	Str.	Gra.	Eg.	Sto.	Ches.
Scranton at E. Port	—	—	—	—	—	—
Pittston at Wechawken	—	—	—	—	—	—
Lackawana at do	—	—	—	—	—	—
Wilk'b're at Hoboken	8 00	8 25	8 25	8 25	9 00	8 25
Old Co. Lehigh at Pt. Johnston	—	—	—	—	—	—
Lehigh at E. Port	—	—	—	—	—	—

For freights to different points see "Freights."

Prices for Coal at Mauch Chunk.

May 1871.

BITUMINOUS COALS.

Kittaning Coal Co.'s Phœnix Vein..f.o.b. at Phila	$	—
Lemon " " "		—
Cumberland Vein Coal		—
Consolidation Coal Co.'s on board	N. Y.	6 75
Maryland Coal Co. "	"	6 75

Prices at Baltimore—May, 1871.

Wholesale Prices to Trade.

Wilkesbarre, by cargo or car load	$—	@	—
Pittston and Plymouth, do	—	@	—
Shamokin Red or White Ash, do	—	@	—
Lykens Valley Red Ash, do	—	@	—
Zerba Valley	—	@	—
Trevorton	—	@	—
By retail, all kinds per ton of 2240 lbs.	—	@	—
Georges Creek & Cumberland f. o. b. at Locust Point for cargoes	4 75	@	4 85
Fairmont and Clarksburg gas, f. c. b. at L. Point	6 00	@	6 50

Prices at Georget'n, D.C., & Alexandria, Va.

May, 1871.

George's Creek and Cumberland f. o. b. for shipping..$4

Prices at Havre de Grace, Md.

Wilkesbarre and other White Ash for cargoes	$—	@	—
Lykens Valley	—	@	—
Shamokin Red or White Ash	—	@	—
Trevorton and Zerba Valley	—	@	—

Prices of Gas Coals.

May, 1871.

PROVINCIAL.

Corrected weekly by Louis J. Belloni, Jr., 41-43 Pine st., N. Y

	Duty, $1 25, gold	Coarse	Slack.
Block House		$1 75	@1 75
Gowrie		1 75	@1 75

Corrected by Bird, Perkins & Job, 86 South street.

	Coarse.	Culm of Coal.
Pictou	$2 25	@1 25
Sydney	2 25	@1 80
Lingan	1 60	@1 80
Little Glace Bay	1 60	@1 00
Caledonia	1 60	@1 80

A discount from the prices of the coarse Coal on purchase of 5000 tons and upwards. Duty $1 25 per ton, gold, on the coarse coal. 25 per cent. ad valorem on the Culm of Coal.

AMERICAN.

	Currency.		
Westmoreland	7 10	@	7 25
Fairmount Gas Coal Co. of N. Y.	7 50	@	— —
Despard Coal Co.	$7 50	@	— —
Penn	7 75	@	8 00
Newburg Orrel Gas	— —	@	— —
West Fairmount Gs Caoal	8 00	@	— —

AT PHILADELPHIA.

Powelton	$7 75		

Prices of Foreign Coals.

May, 1871.

Duty $1 25 per ton.

Corrected weekly by PARMELE BROS., No 32 Pine street New York.

Liverpool Gas Caking	$ 9 00	@	— —
" " Cannel	11 50	@	12 50
" " House	— —	@	16 00
" " Orrel	12 00	@	14 00

Per ton 2,240 lbs., ex-ship.

PRICES FROM YARD.

Liverpool House Orrel, screened	$16 00	@	17 50
" " Cannel, "	18 00	@	20 00

Per ton 2,000 lbs. delivered.

Freights.—May, 1871.

TO EASTERN PORTS.	From Philadel'a.	From E Port and Port Johnston.	From Newburg...	From Rondout...
Amesbury	$2 50	$2 00		
Bangor	2 30	1 60		
Bath	2 10	1 75		
Boston	2 10	1 50		
Bridgeport	1 75	1 00		
Bristol	2 00	1 40		
Cambridgeport	2 75	1 75		
Derby	2 00	1 20		
Dighton	2 30	— —		
East Cambridge	2 35	1 75		
Fall River	2 00	1 40		
Hackensack	1 75	1 00		
Hartford	2 50	1 25		
Jersey City	1 40	50		
Middletown	2 25	1 25		
Mystic	2 30	1 25		
New Bedford	2 00	1 40		
Newburyport	2 65	1 85		
New Haven	1 90	1 00		
New London	1 76	1 25		
Newport	2 00	1 40		
New York	1 30	50		
Norwalk	2 80	1 00		
Norwich	2 00	1 30		
Pawtucket	2 30	1 50		
Portland	2 30	1 50		
Portsmouth, N. H.	1 45	1 85		
Providence	2 00	1 25		
Rockport	2 10	1 65		
Saco	2 25	1 75		
Sag Harbor	1 70	1 20		
Salem	2 35	1 65		
Stamford	2 00	1 00		
Stonington	2 00	1 30		
Taunton	2 30	1 75		
Warren	— —	1 40		
Washington	1 25			
TO RIVER PORTS.				
Albany				
Catskill				
Cocksackie				
Coeyman's				
Cold Spring				
Fishkill				
Haverstraw				
Hudson				
New York				
Nyack				
Poughkeepsie				
Rhinebeck				
Rondout				
Sangerties				
Sing Sing				
Stuyvesant				
Tarrytown				
Troy				
West Point				
Yonkers				

Foreign and Provincial Freights.

May, 1871.
Closed for the winter.

Foreign.
Newcastle and Ports on Tyne, per keel of 21 1-5 tons.....£14 00@£16 00
Liverpool, 5 per cent primage.....13s @15 ton.

TO NEW YORK.

Provincial.
Sidney.....$ —
Lingan.....—
Cow Bay.....—
Port Caledonia.....—
Little Glace Bay.....—

TO BOSTON.

Sydney.....$ —
Lingan.....—
Cow Bay.....—
Port Caledonia.....—
Little Glace Bay.....—

Rates of Transportation to Tide Water.

Closed for the Season.

BY RAILROAD.

TO PORT RICHMOND, PHILADELPHIA.

Philadelphia and Reading Railroad, from Port Carbon.....$4 00
Less drawback of 50 cents on all Coal shipped east of New Brunswick and south of Cape Henry.

MAUCH CHUNK TO ELIZABETHPORT.

L. V. Railroad from Mauch Chunk to Easton.....$1 84
C. R. R. N. J., Easton to Elizabethport.....2 09
Shipping expenses at Elizabethport.....25
Warfage.....10
Total.....$4 88

MAUCH CHUNK TO PORT JOHNSON.

L. V. R. R., or L. & S. R. R. from M. C. to Easton...$1 84
C. R. R., of N. J., Easton to Ft. Johnson.....2 72
Shipping expenses.....25
Warfage.....10
Total.....$4 91

TO HOBOKEN.

L. V. R. R., Mauch Chunk to Easton.....$ —
Morris & Essex R. R. Easton to Hoboken.....—
Shipping expenses.....—
Warfage.....—
Total.....$ —

TO SOUTH AMBOY.

L. V. R. R.....—
B. & D. R. R.....—
Cam. & Am. R. R.....—
Shipping Expenses.....—
Total.....$ —

PENN HAVEN TO ELIZABETHPORT.

L. V. RR. Penn Haven to Easton.....—
C. RR. of N. J. Easton to Elizabethport.....—
Shipping expenses.....—
Wharfage.....—
Total.....$ —

METALS.

NEW YORK, May 5, 1871.

IRON.—Duty: Bars, 1 to 1½ cents ℔ lb: Railroad, 70 cents ℔ 100 lbs.; Boiler and Plate, 1¼ cents ℔ lb; Sheet, Band, Hoop, and Scroll, 1½ to 1¾ cents ℔ lb: Pig, 7 ℔ ton; Polished Sheet, 3cents ℔ lb; Galvanized 2½; Scrap Cast, $6; Wrought, 8 per ton.

	Store Prices.
Pig, Scotch No. 1, ℔ ton	33 00@36 00
Pig, American, No. 1	34 00@36 00
Pig, American, No. 2	32 00@34 00
Pig, American, Forge	31 00@32 00
Bar Refined, English and American	— —@75 00
Bar Swedes, assorted sizes (gold)	85 00@100 00
	Store Prices, Cash.
Bar, Swedes, ord'y sizes	105 00@115 00
Bar, Refined	77 50@ — —
Bar, Common	85 00@ — —
Scroll	—@— —
Ovals and half-round	100 00@120 —
Band	95 00@105 00
Horse Shoe	92 50@ 95 —
Rods, ⅝ to 3-16 inch	82 50@120 —
Hoop	100 00@140 00
Nail rod	— —@6¾ —
Sheet, Russia, as to Nos. (gold)	10¼@—11
Sheet, Single, D, and T. Common	—@11½@—13
Sheet, Galv'd, Nos. 14 to 26, 9 and 11c. Nos. 27, 28, and 29, 11½@14	
Rails, English (gold), ℔ ton	55 00 @57 00
Rails, American, at Works in Pa	70 00 @72 00

STEEL.—Duty: Bars and ingots, valued at 7 cents ℔ lb or under, 2¼ cents; over 7 cents and not above 11, 3 cents ℔ lb; over 11 cents, 3½ cents ℔ lb, and 10 ℔ cent ad val. (Store prices.)

English Cast (2d and 1st quality) ℔ lb	— 15 @— 18
English Spring (2d and 1st quality)	— 7 @— 10
English Blister (2d and 1st quality)	— 10 @— 17
English Machinery	— 11½@— 14
English German (2d and 1st quality)	— 13 @— 15
American Blister "Black Diamond"	— — @— 12
American, Cast, Tool do.	— 16 @— 17
American, Spring, do.	— 9 @— 11
American Machinery, do.	— — @— 12
American German, do.	— 9 @— 12

COPPER.—Duty: Pig, Bar, and Ingot, 5; old Copper 20 cents ℔ lb; Manufactured, 45 per cent. ad val.

	All Cash.
Copper, New Sheathing, ℔ lb	— @— 30
Copper Bolts	— @— 32
Copper Braziers, 16oz. and over	— @— 32
Copper Nails	36 @— 38
Copper, Old Sheathing, &c. mixed lots	— @— 19
Copper, old, for chemical purposes	20 @— 21
Copper, American Ingot	21¾@— 21½
Yellow Metal, New Sheating & Bronze	— @— 22
Yellow Metal Bolts	24 @— —
Yellow Metal Nails	— @— 22

LEAD.—Duty: Pig, $2 ℔ 100 lbs.; old Lead, 1½ cents ℔ lb: Pipe and Sheet, 2¼ cents ℔ lb.

Galena, ℔ 100 lbs	$— @—
Spanish (gold)	6 12½@6 15
German, do.	6 12½@6 15
English, do.	6 15 @6 50
Bar (net)	— — @8 75
Pipe (net)	— — @10 25
Sheet	— — @10 25

Colwell, Shaw & Willard Tin-Lined Pipe 15 cts. ℔ lb.

TIN.—Duty: Pig, Bars, and Blocks, 15 ℔ cent. ad val.; Plate and Sheets and Terne Plates, 25 ℔ cent.; Roofing 25. ad val.

	Gold ℔ lb.
Banca	38¾–38¼
Straits	32½@33
English	32½@32¾

PLATES.

	Fair to Good Brands.	Gold.	Currency.
I.C. Charcoal, ℔ box	$8 37½@8 62½		$9 50 @10 00
I. C. Coke	7 25 @7 75		8 25 @ 8 75
Coke Terne	6 12½@7 12½		7 00 @ 8 25
Charcoal Terne	7 75 @8 25		8 75 @ 9 50

REMARKS.

IRON.—There has been an improved demand for Scotch Pig, and we notice sales of one 1000 tons Eglinton and Gartsherre, on the spot and to arrive, mostly here, on private terms. The arrivals since our last have been quite liberal, and prices are not very firm, although without quotable change. The demand for American continues light, but with moderate offerings and light stock, prices are maintained; 300 tons Crane and 100 do. Hudson sold on private terms; we quote No. 1 $34 @ $36, and No. 2 $32 @ $34. Wrought Scrap is in moderate request, and sales have been made of 150 tons from yard at $41,50. New Rails remain quiet, but steady at the quotations noted in our last. Refined Bar is steady and quiet at previous quotations. A sale of 250 packs Russia Sheet was made at 10¼ cents, gold—now held at 11, gold.

LEAD.—Prices of Pig are rather lower, and at the concession there has been more business; sales have been made of 100 tons ordinary Foreign at $6 12½@$6 15 gold, and 350 do., Spanish on private terms. Bar 8¾, and Pipe and Sheet 10¼ cents cash, usual discount to the trade—Tin-lined Pipe, 15 less 2 cents to the Trade.

TIN.—The market for Pig remains in the same stagnant position, and in the almost entire absence of business, prices are in a great measure nominal. Straits is held at 32½@33 cents, English 32¼@32¾, and Banca 38@38½, all gold. The only sale is 5 tons English at 32¼ cents. Plates are quiet, the distribution demand being very light. Coke Tin 10 by 14 and 12 by 12 are very scarce. We notice sales of 600 bxs. Charcoal Terne at $7 75 gold; and 1500 do., to arrive, on private terms.

COPPER.—The manufactures of Copper and Yellow Metal are steady at our quoted rates. Ingot is quiet, Manufacturers buying now only from hand-to-mouth, pending the arrival of the parcels of Lake they have contracted for, due next month. The sales are 150,000 lb., Lake, Baltimore and Tennessee, in lots, at 21½ cents; 50,000 lb., Lake, 21¾; and 75,000 lb do., for future delivery, on private terms.

ZINC.—Spelter, Silesian, 5½c., gold; Spelter, Domestic, 7c., currency: Zinc, Sheet, 8¼c., currency; Zinc Paint, French, 9½c.; Zinc Paint, American, 8c.; Manganese, black wide, 4c.; Manganese Peroxide, highest grade, 5½c.

Mining Stocks.

NEW YORK, May 5, 1871.

The following quotations are reported by the New York mining stock board:—

PETROLEUM STOCKS.

	BID.	ASKED.
Bergen Coal and Oil	—	15
Bennehoff Run	20	—
Blood Farm	—	—
Brevoort	30	40
Bliven Oil	30	—
Buchanan Farm	35	—
Central	70	—
Clinton	10	—
Home	100	—
Phillips Pet	—	—
Rynd Farm	—	—
United Petroleum Farms	31	35
United States	22	—
National	—	—
New York & Allegheney	50	—
Northern Light	35	—
Pit hole Creek	30	—
Rathbone Oil	20	—
Second National	—	—
Sherman & B	—	—
Tarr Farm	—	—

GOLD STOCKS.

	BID.	ASKED.
Bates & Baxter	25	35
Benton	—	—
Black Hawk	—	—
Central Gold	9	12
Cons Gregory	35	50
Grass Valley	—	18
Gunnell	—	—
La Crosse	17	—
Liberty	—	—
Mariposa prf	10	—
Rocky Mount	—	—
Quartz Hill	—	—
Smith & Parmlee	35	50
N. Y. & Eldorado	—	—
American Flag	10	—

San Francisco Stock Market.

A telegram from San Francisco May 4, quotes mining stocks as follows:—

Savage	46
Yellow Jacket	70
Kentuck	69
Chollar Potosi	79
Gould & Curry	75
Belcher	79
Imperial	42
Amador	—
Crown Point	1 86
Hale & Norcross	—

The Slate Trade.

NEW YORK, May 3, 1871.

We clip the following item relative to the slate trade in Hydeville, from one of our exchanges. We do not know to whom credit belongs. It will be observed that some statements made recently in regard to the loss sustained by the West Castleton Slate Co., are corrected here: "The Slate business this season is unusually brisk. Orders for slate goods began to come in at the unusually early date of the first of March, and all the mills are being driven to their greatest capacity. The West Castleton Slate Company, whose mills were so badly damaged by fire some days ago, had at the time of that occurrence over $75,000 worth of orders on hand to be filled. Their loss by the way, will reach $100,000, instead of being only $50,000, as at first stated in the papers. There was no insurance. The company is already busy erecting machinery and buildings, and will resume operation as soon as the works can be repaired. Their mill was capable of turning out 20,000 feet of slabbing per month. It was one of the largest in the world. The new mill of E. A. BILLINGS, of this place, is being rapidly put up. Meantime he is supplying his customers from the mill which he temporarily hired immediately after the destruction of his old mill by fire a few months ago. The new structure will be larger, more commodious and in every way better adapted to the manufacture of slate than were his old quarters."

From the *Slatington News* we clip the following item relating to a new mill recently erected at that place: "Mr. D. WILLIAMS has put up a new factory at his quarry near the Lehigh Valley railroad depot, and is fitting it up with machinery to make mantels, flaggings, etc. Mr. WILLIAMS is an enterprising man, and will turn his quarry to the branch of business that pays best. He has for several years been largely interested in the school slate manufacture, during which time he has shipped a large amount of the article. His quarry is particularly adapted to the school slate manufacture, but contains also roofing slate, and furnishes good material for mantels and flagging. The slate are even and straight-grained and can be split almost to any size; we saw, a few days ago, at his quarry, a piece split to about the size of thirty feet wide, forty long, and about ten inches thick." The increased amount now going on seems to be having a marked effect upon the trade which now seems in a very favorable state.

[Corrected weekly.]
(A "square" represents 100 superficial feet.)

PRICES OF ROOFING SLATE IN NEW YORK.

Vermont purple, 1st quality, per square	..	$6 50@	7 00
" green, 1st " "	..	6 50@	7 00
" red, 1st " "	..	15 00@	16 00
" variegated, "	..	5 75@	6 20
d. b'k and d'k blue, 1st qual., "	..	6 00@	7 05

PRICES OF ROOFING SLATE LOADED ON THE CARS AT POULTNEY.

Red,	per square	$7 00 @	$11 00
Purple,	" "	4 50 @	5 00
Best q'l. Unf'g, Gr'n.	" "	4 50 @	5 00
Gr'n. or Vargtd.	" "	3 25 @	4 25

VERMONT SLATE TRADE.

REPORT of Slate Shipped from Middle Granville, N. Y., via the R. & S. R. R., for the week ending April 29, and for the year 1871.

ROOFING SLATE.

NO. OF SQUARES.	Week.	Prev'ly.	Year.
†Penrhyn Slate Co	60	870	930
New York, *and Middle Granville Slate Co	440	605	1045
†American Slate Co	....	....	....
Benj. Williams	32	383	415
Jones & Williams	....	....	....
Eagle Slate Co	....	60	60
Mettowee Slate Co	25	145	170
Albany Slate Co	60	55	115
H. W. Hughes	....	30	32
Total	....	....	—

MILL STOCK, MANTLES, &c.

NO. OF CASES SHIPPED BY	Week.	Prev'ly.	Total.
Eagle Slate Co.....cars.	....	....	....
Penrhyn Slate Co. "	15	1,301	1,516

BLACK BOARDS.

NO. OF CASES.	Week.	Prev'ly.	Total.
Eagle Slate Co	....	....	....
Penrhyn Slate Co	....	....	....

MILL STOCK, &c.

NO. OF CARS SHIPPED BY,	WEEK.	PREVIOUSLY.	YEAR.
Eagle Slate Co....cars.	1	7	8
Penhryn Slate Co	....	....	....

* Sales made together this season.
† Consolidated Sales.

PENNSYLVANIA SLATE TRADE.

The following is a weekly statement of Roofing Slates, School Slates and Mantels, shipped from Slatington, via Lehigh Valley Railroad for last week, ending April 29, 1871.

ROOFING SLATE.

Jones & Williams	35 squares.
Locke Slate Co	86 "
D. Williams & Co	35 "
J. Anthony	35 "
Columbia Slate Co	35 "
H. Williams	70 "
Lehigh Slate Co	53 "

SCHOOL SLATE.

D. Williams	126 cases.
Lock Slate Co	23 "
Lehigh Slate Co	27 "

MANTLES.

Lehigh Slate Co	43 "

BLACK BOARDS.

Lehigh Slate Co	3 "

BY THE L. S. RAILROAD.

ROOFING SLATE.

Heimbach Slate Co	105 "
Twin City Slate Co	140 "

MANTELS.

Heimbach Slate Co	2 "

BLACKBOARDS.

Heimbach Slate Co	2 cases.

FROM TREICHLER'S STATION.

Eagle Slate Co	105 squares.
Continental Slate Co	175 "
National Slate Co	27 "

SCHOOL SLATES.

A. W. Lerch	110 "

The Darien Ship Canal.

CHIPAGANA, COLOMBIA, April 25, 1871.

THE survey of the Darien canal route from Cupica Bay to the Atrato, *via* Napipi river, is complete. The United States steamer Resaca has returned to this settlement to await the arrival of the party from Boca Paya. Commander SELFRIDGE thinks his discovery successful for the purpose intended.

The distance from Cupica Bay to the Atrato, along the bends of the Napipi river, is sixty-nine and a half miles; on a straight line only twenty miles from the Atrato. Some of the party proceeded to Veggia village, ten miles further up, for provisions. The Napipi river flows through a mountainous country for about thirteen miles from the foot of the divide, and is supplied from the Doguado river as a tributary.

It is proposed to make thirteen locks from the Doguado, eighteen miles from the Atrato to the divide, then to tunnel through and descend to the Pacific by nine locks.

The survey occupied twenty-seven days. No intelligence has been received from the explorers up the Cue. It is certain they have met the party following the Paroncheta river from the Atrato. The elevation in that direction is likely to exceed that previously announced, in regarding the route *via* Tuyra as impracticable. The party will return as they came. Those on this side intend drawing a line from the headwaters of the Cue.

Great hardships have been experienced by the party moving along the river. Two-thirds of the men are down with the fever. Over twenty seamen and macheteros are under medical treatment at Boca Paya. Only four men and an officer were able to advance to the divide. The entire party will return to the Resaca in a fortnight. It is still hoped that the route *via* Tuyra will prove successful.—*N. Y. Herald.*

Steel Bridge Across the Mississippi.

WE notice the *Iron Age* and several other papers announce that "the great steel bridge across the Mississippi River at St. Louis was completed on the 11th inst." This is a mistake. The piers are all above water, and the work progressing very rapidly, but the date of completion of so stupendous a work can hardly be fixed to a day. But it is being pushed forward as rapidly as men and money can do it.

Future Great Cities.

THE Nevada City *Times* is of the opinion that one of the "Future Great Cities" is to be in Vernon county. We quote: "In five years from to-day railways from seven different directions will unite here. This will be followed by busy manufactures here and a great wholesale trade. Foundrys, machine shops, and agricultural implement works will be established here. The signs of such things indicate that Nevada is to be the chief city of the western border of our State, with the exception of Kansas City. * * * * We believe the hour has now come when Vernon county may seize the supremacy in this part of Missouri, and soon create great local wealth, besides building up a city which may be the boast of the border, and the real gateway of Southern Kansas and the Indian Territory. Have we the men for the hour in the mass of our voters? Every man must come out of his Heculaneum or his Pompeii into the light of day, and Vernon will rise with irresistible force to riches and influence."

A Narrow Gauge Road in Missouri.

A NARROW-GAUGE railroad has been built by the Hermitage Iron Company, to connect their iron ore banks in Crawford county with Atlantic and Pacific Railroad near Iron Centre, 93 miles from St. Louis. The gauge is 30 inches, length of track two miles. The engine has been built in St. Louis, and the road will be completed this week. The company expect to transport 100 tons per day to the Atlantic and Pacific Railroad, thence to St. Louis.

Power of India-Rubber to Deaden Sound.

Chambers' Journal gives this illustration of the power of India-rubber to deaden sound: We once visited a factory where some forty or fifty coppersmiths were at work in a shop above our heads; but, what was remarkable, scarcely a sound of their noisy hammering could be heard. On going up stairs we saw the explanation. Each leg of every bench rested on a cushion made of India-rubber cuttings. This completely deadened the sound.

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Eozoon Canadense.

IN our issue of February 21st, we published an article by T. MELLARD READE on the examinations made by Professors KING and ROWNEY with reference to the organic origin of specimens known as *Eozoön Canadense*, and which were first described five years ago by Messrs. DAWSON, CARPENTER, and STERRY HUNT, of the Canadian Geological Survey. These latter gentlemen, after a careful microscopical and chemical examination, pronounced the *Eozoön* of organic origin, and this view was attacked by the first-named gentleman on the ground that the so-called fossil remains were only found in metamorphic rocks, and that the infilling material consisted of serpentine, a mineral to which a metamorphic origin has been generally ascribed.

From Dr. HUNT we learn that an elaborate reply to the argument of Messrs. KING and ROWNEY has recently been sent to the Irish Academy, and that at a recent meeting of the Natural History Society, held in Montreal on the 24th ultimo, he brought before that body one of the points contained in the reply.

We publish below an account of the proceedings from the Montreal *Gazette*. The President, Principal DAWSON, occupied the chair: A communication on a Mineral Silicate injecting Paleozoic Crinoids was then made by Dr. T. STERRY HUNT, F. R. S.

"The author described a gray granular paleozoic limestone from New Brunswick, which had been examined by Dr. DAWSON, and found to consist almost entirely of the comminuted remains of brachiopod and gasteropod shells, crustacea, and the joints and plates of crinoids, cemented with a little calcareous spar. The crinoidal remains were, however, found to have their pores filled with a peculiar silicate, which is exposed in relief when the surface of the limestone is attacked by an acid, and then appears as a congeries of small cylindrical rods or bars, anastomosing and forming a beautiful network, which, under a magnifying glass, exhibits a frosted crystalline surface, and resembles the variety of aragonite known as *flos ferri*. This silicate, which also fills small interstices among the other calcareous fragments making up the limestone, is greenish in color, and forms about five per cent. of the rock. Though insoluble in dilute acids, it is completely decomposed by strong acids, and is found to be a hydrous silicate of ferrous oxide and alumina, with some magnesia and a little alkali, closely allied to fahlunite and to jollyte. (The results of its analysis will be found below.)

"Dr. HUNT remarked that this process of infiltration, by which the minute structure of these paleozoic crinoids has been preserved, was precisely similar to that seen in the glauconite casts of more modern foraminifera, and in the Eozoön of older times. This ancient calcareous rhizopod, though most frequently preserved by serpentine, had been shown, both by himself in Canada and by HOFFMAN in Bohemia, to be in some cases injected by silicates related in composition to that of these crinoids. He then proceeded to speak of the great class of silicates of which serpentine, loganite, pyrosclerite, fahlunite, and jollyte are members, and which are generally described as the results of pseudomorphic changes of pre-existing silicates or carbonates, but which he, since 1853, has maintained to be original aqueous depositions, similar in their origin to the related mineral glauconite—a view now adopted by such investigators as NAUMANN, SCHEERER, GUMBEL, and CREDNER. He noted in this connection the bearing of these facts on the *Eozoön Canadense* of DAWSON, the organic nature of which, though almost universally admitted by zoölogists and mineralogists, was nevertheless still questioned by Messrs. KING and ROWNEY. These gentlemen object that the ancient rocks in which Eozoön is found are what are called metamorphic strata, which have been, according to them, subjected to pseudomorphic changes, and therefore the Eozoön may be the result of some unexplained plastic force, which has fashioned the serpentine and other mineral silicates into forms so like those of foraminiferal organisms as to deceive the most practiced observer. This, said Dr. HUNT, was going back to the notions of those who, rather than admit that mountains had been formed beneath the sea, imagined that the fossil shells which they often contain were not the real shells of animals, but the result of some freak of nature. The argument of Messrs. KING and ROWNEY that the Eozoön rock is a result of pseudomorphic alteration, because it contains serpentine, is a begging of the question at issue, by asking us to admit that the presence of serpentine is an evidence of metamorphic change, which is denied. He then remarked that the specimens of this organic limestone, with its injected crinoids, differed from Eozoönal rock only in containing at the same time recognizable fragments of other organic remains, and in presenting in its injected portions the differences which distinguish the minute structure of a crinoid from that of a calcareous rhizopod. In conclusion, he again adverted to the views which he had long maintained as to the origin of great masses of silicated rocks by a direct process of deposition from watery solutions, in which they were formed by chemical reactions.

"Dr. DAWSON spoke confirming the observations of Dr. HUNT which he had verified by microscopic examinations. He alluded to the structure of crinoids, which in the fossil state were generally filled with carbonate of lime, so as to obliterate their pores. The infiltrating silicate in the present case, however, showed, especially in decalcified specimens, that these ancient crinoids closely resembled in their minute structure the modern forms lately studied by Dr. W. B. CARPENTER and Professor WYVILLE THOMPSON, especially *comatula*. Figures of these decalcified specimens were exhibited, and will be published. Dr. DAWSON alluded further to the process of filling up the porous calcareous skeleton of the crinoids, which was clearly shown to be prior to the cementing and consolidation of the fragmentary limestone."

In *Silliman's Journal* for May, are published papers on the mineralogy of *Eozoön Canadense*, by Dr. ROBERT HOFFMAN, of Prague, Bohemia, translated from the *Journal für prakt Chemie*, and the results of the analysis of the fossil by Dr. T. STERRY HUNT. The results of these authors agree with striking accuracy, when we consider the different locality of the specimens examined, and the somewhat different methods pursued in preparing the material for analysis.

Dr. HOFFMAN gives the following analysis of a mineral which he compares to fahlunite and of the specific gravity 2.687—silica, 36.4; alumina, 32.9; ferrous oxide, 20.1; lime, 0.6; potash, 2.7; water, 7—a silicate from Bohemian specimens.

Dr. HUNT's analysis of a silicate found by him in Canadian specimens gives—silica, 38.9; alumina, 28.8; protoxide of iron, 18.8; magnesia, 4.25; potash, 1.69; soda, 0.48; water, 6.91.

DR. HOFFMANN describes the Eozoön mass as having a superficial resemblance to that of Canada, appearing in waved or concentric band, oval in form, or else in irregular acervuline aggregates. In the oval banded portion, the shell of the Eozoön, a nearly pure, finely granular calcite, can be separated from the mineral representing the sarcode, which is described by HOFFMANN as a cast of the soft parts of the Eozoön, formed through infiltration of watery solution either during the growth or immediately after the death of the animal. It is a peculiar silicate, fine-grained, grayish white, and somewhat translucent. Associated with this is a finely granular dolomite, destitute of any traces of organic structure, which sometimes appears to have served as a centre or point of attachment to the growing Eozoön. In other cases, however, broken fragments of older Eozoön had served as nuclei, and become surrounded with a fresh growth. These materials, which constitute what HOFFMANN has described as the Eozoön reef, are associated with two other silicated minerals. One of these, allied to fahlunite, has a specific gravity of 2.687, is grayish brown or greenish black in color, dull, or with a somewhat fatty lustre, and nearly opaque. This substance forms nearly parallel streaks in the central parts of the Eozoön reef, and moreover surrounds it, intersecting and wrapping around the Eozoön mass in multiplied layers, a line or more in thickness, which are interlaminated with a light green mineral, transparent, with a somewhat vitreous lustre, and a density of 2.56. It is a hydrous silicate, allied to picrosmine, and is more or less penetrated by magnesite.

The band of Eozoön rocks at Raspenau lies between silicated schistose rocks beneath, and overlying beds of granular limestone, some of them grayish white, and others blackish, from an admixture of carbonaceous matter. One of these gave to analysis 1.100 of carbon, 2.332 of insoluble matter, and 4.708 of carbonate of magnesia, the rest being carbonate of lime.

Dr. HUNT, after mentioning the minute structural similarity observed by Dr. DAWSON, by miscroscopic comparison of the skeletons of the paleozoic and recent crinoids, which have been studied by CARPENTER, says: "When this limestone is dissolved in dilute hydrochloric acid, the residue, washed by decantation, equals from five to six per cent. of the weight of the mass, and is seen under a microscope to consist entirely of the casts composed of the mineral just noticed, mixed with about one-fourth of coarse siliceous sand. This matter is pale grayish green in color, but, when calcined, becomes of a bright reddish brown, without change of form. Heated in a close tube it gives off water, and becomes much darker in color. It is partially attacked by strong hydrochloric acid, which takes up much protoxide of iron; but is readily and completely decomposed by hot concentrated sulphuric acid, leaving a skeleton of silica, which, by a dilute solution of soda, is readily separated from the intermingled grains, more or less rounded, of colorless vitreous quartz."

After giving the analysis, which, for the sake of convenience of comparison, we have placed adjoining that of Dr. HOFFMANN, Dr. HUNT adds: "This mineral approaches closely in composition to jollyte, but differs from it in containing a portion of alkalies, and but one-half as much water. In these respects it agrees closely with a silicate found by ROBERT HOFFMANN with the Laurentian Eozoön of Raspenau. This latter is compared by HOFFMANN to fahlunite, to which species also jollyte is allied in physical characters as well as in composition ("Dana's Mineralogy," page 493). Under the names of fahlunite, pinite, etc., is included a great class of hydrated silicates, which, from their imperfectly crystalline condition, have generally been regarded, like serpentine, as the results of the alteration of other silicates. It is, however, difficult to admit that silicates found in the condition described by HOFFMANN, and still more the present mineral, which injects the pores of the paleozoic crinoids, can be any other than original depositions, allied in the mode of their formation to the serpentine, pyroxene, and other minerals which fill the chambers and canals of the Laurentian Eozoön, and to the glauconite which occurs in a similar manner in tertiary and recent shells. The limestone from Woodstock, apart from the insoluble matters just described, is very pure, yielding only 1.80 per cent. of alumina and iron-oxide, and magnesia equal to 1.35 per cent. of carbonate."

Messrs. KING and ROWNEY rested their argument against the organic origin of the specimen in question mainly on the ground that the prevailing infilling material was a mineral analagous to serpentine, and denied that such material ever formed the matrix of any known fossils. It would seem, as Dr. HUNT shows, that an analogous mineral does occur in tertiary and recent shells, and that the structure conforms closely to that of modern crinoids. The question seems to be, Shall we disbelieve our eyes or modify our theory of serpentine?

Iron Rust.

VERY many scientific discoveries take their rise from observers being dissatisfied with what were previously considered undoubted and most reliable facts. Sir CHARLES FOX has lately given such a stimulus to an inquiry into the composition of iron rust. In a discussion with professor GRACE CALVERT, of Manchester, he was told that all chemists admitted it to be hydrated sesqui-oxide of iron containing a trace of ammonia, but as Sir CHARLES still objected, Professor CALVERT analysed for him a sample taken from the outside of Conway Bridge and another taken by himself from Llangollen. Results were as follows:—

	Conway Bridge.	Llangollen.
Sesqui-oxide of iron	9·3094	9·2900
Protoxide of iron	5·816	6·177
Carbonate of iron	0·900	0·617
Silica	0·196	0·121
Ammonia....	trace	trace
Carbonate of lime	—	0·295

These results showed that, as Sir CHARLES FOX imagined, the composition of iron rust is not simple, but complicated; and on Professor CALVERT investigating the conditions under which rusting of iron takes places he met with some unexpected phenomena. He exposed blades of steel and iron for four months over mercury to currents of dry oxygen, damp oxygen, dry carbonic acid, damp carbonic acid, dry oxygen and ammonia, damp oxygen and ammonia, dry carbonic acid and oxygen. Very slight traces of oxidation were visible in any of these cases, and in these instances not in all the blades tested. But when he used a mixture of damp carbonic acid and oxygen in a few hours the blades became of a dark green color, which soon turned to the usual ochre-brown of rust. He assumes that carbonic acid is the gas which determines the oxidation of iron, and that it is to its presence in the atmosphere and not to the aqueous vapor or oxygen, alone or together, that rusting is due.—*Ex.*

Improvements in the Process of Working Gold Quartz Containing Sulphurets.

THE Ricketts mill at Greenville, N. J., works gold quartz from the island of Aruba, near the coast of Venezuela. This quartz contains from two to three per cent. of sulphurets, a mixture of copper pyrites, common iron pyrites and marcasite. With the present apparatus for the concentration of sulphurets, it has not been possible to reduce the value of the tailings below from $30 to $50 per ton, and protracted experiments with different apparatus for wet and dry concentration resulted in the most favorable cases in a reduction of the contents of gold in the tailings to from $22 to $25 per ton. Repeated trials to concentrate the same lot of ore gave a mass which still contained fifty per cent. of the original amount of quartz.

This extraordinary behavior of the ore can only be brought about by several apparently complicated causes, at least one of which is now explained by Mr. A. MEZGER, M. E. the chemist of the works.

The mill is so arranged, that the tailings, after passing through a Dodge amalgamator, flow into two boxes, in the first of which the "sands" settle, while the second contains only slimes. In the latter box Mr. MEZGER noticed an evolution of gas, which goes on constantly and becomes very abundant whenever the slimes are stirred in the least. This gas proved to be hydrogen.

The cause of this is simple enough—decomposition of the water by the oxidation of the marcasite; but it has not been known heretofore that such an oxidation would commence so soon, in fact, while the sulphurets are passing through the mill; and the extraordinary energy with which it takes place here, can only be explained by as yet unknown causes possibly brought on by the intimate mixture of the three sulphurets. Mr. MEZGER will probably soon be able to throw some light on this question. For the present, the presence of hydrogen gas explains the difficulty experienced in concentration. Adhering to the particles of sulphurets, it renders them as light or lighter than the quartz.

Mr. MEZGER proposes now to accomplish the concentration of the sulphurets before bringing the pulp into the Dodge amalgamators immediately after crushing, and to amalgamate the quartz and sulphurets separately. A further advantage in so treating his particular ores arises from the fact that he avoids the deposition of the sulphurets on the sheet of quicksilver in the amalgamator for the great mass of his ore, which heretofore has invariably taken place, rendering the quicksilver "dull" and necessitating a frequent cleaning of the amalgamators. In the method now to be followed this cleaning will be unnecessary, and the capacity of the works will thereby be largely increased, while a higher yield of gold is a natural consequence.

To obviate the loss of float gold, Mr. MEZGER has also proposed to introduce a new method, the principle of which has been lately tried with good effect at Grass Valley, and of which we will speak in detail as soon as the process is carried out on a working scale.

Postal Telegraphs in England.

THE last report submitted to the Postmaster-General on the telegraphs shows that on the 31st of December last, there were 334 telegraph stations open in London. Of this number 15 are in direct communication with the head office in Telegraph street. The communication of the Threadneedle street, Stock Exchange, Lothbury, Leadenhall street, Fenchurch street, Cornhill, Gresham House, St. Martin's-le-Grand, Royal Exchange (Lloyd's), the Baltic, the Old Broad street (British Indian), and Temple Bar offices with the head office is effected by means of pneumatic tubes, these being the most important collecting offices, of which the Stock Exchange takes the lead. The messages collected at the postal telegraph stations in London form about 20 per cent. of the whole number of messages collected at all the stations throughout the United Kingdom, and of these about 20 per cent. (averaging 5,000 per week) are local messages—that is, messages handed in in one part of London for delivery in some other parts of the metropolis. Since the transfer of the telegraphs to the Government the mileage of wire of which the loyal system is composed has already been increased by fifty per cent.—*Ex.*

THE ENGINEERING AND MINING JOURNAL.

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The American Institute of Mining Engineers.

SOME time ago, we called the attention of our readers to an important movement, initiated by Messrs. ECKLEY B. COXE, R. P. ROTHWELL, and MARTIN CORYELL, mining engineers of Pennsylvania, for the purpose of securing, by the organization of a professional society, the more economical production of the useful minerals and metals, and the greater safety and welfare of those employed in these industries. The circular signed by these gentlemen, the substance of which we produced in our columns, was extensively circulated by mail also; and a large number of replies have been received, all of which express great interest in the subject, and indicate a wide-spread appreciation of the advantage such an organization will be to the mining and metallurgical industries of our country. In conformity with the views expressed in the circular, it is proposed to hold a meeting in Wilkesbarre, Pa., on Tuesday, May 16, of persons interested in mining or metallurgy, either as owners of works, engineers, or foremen, for the purpose of organizing an American Institute of Mining Engineers. The session will last three or four days. The mornings will be devoted to visiting the mines, furnaces, and other works of interest in the vicinity, and the afternoons and evenings to the reading of papers, of which several have been promised, and the discussion of subjects of interest to the profession; and it is specially desired that as many as possible of those practically engaged in the management of mines, furnaces, etc., should be present, and contribute papers on their respective branches of the profession. Arrangements will be made with several railroads to furnish free return passes to those attending.

We need scarcely say that we look forward with great interest to this meeting, and trust that it will result in a strong, active, harmonious, and enthusiastic organization of our now scattered professional brethren. Nothing could be better calculated to raise the standard of mining science in this country, and promote much-needed reforms in the administration of mines.

The troublesome coal question, for instance, has more to do with the matters of economy and safety in working than the public generally suspects. Both the great waste of coal and the heavy loss of life involved in the method of exploitation prevalent in the anthracite districts, have a direct influence on wages and profits. If the companies saved more than half, instead of losing more than half, the coal in their veins, they could afford good wages to their men. If they purchased the labor only, and not the lives, of their workmen, less wages would still be good wages. Once in a while, the community is startled by some Avondale disaster; but we hear little of the steady loss of lives from fire-damp, falling roof, and other causes, which proper precaution and discipline would prevent. In the mines of one company which we could name, an average of one or two deaths per month from such causes is not considered extraordinary. The miners become reckless of life, and are satisfied if the extra risks are covered with extra pay. All this economical and social evil requires investigation; and such an organization as is now proposed will doubtless take up the matter in a fair and thorough spirit.

This is only one of many reforms which the moral power of an American Institute of Mining Engineers will be able to effect. But perhaps a still greater benefit will result from the personal intercourse of the members, and their contributions from experience to the science and literature of their profession. We call upon all American mining engineers to support this plan with their influence and direct assistance.

Especially let us have a large attendance at the Wilkesbarre meeting, not only that an enthusiastic commencement may ensure success, though this reason should be sufficient; but on account of the great inducements presented by the locality itself. The American Institute of Mining Engineers may meet for a hundred years to come (and we trust it will), but it is not likely to find a neighborhood more attractive and instructive than Wilkesbarre.

Colorado Tunnels.

IN a recent article on the Burleigh Tunnel, of Colorado, we gave our views at length as to the policy of prospecting with deep cross-tunnels. Our statements were made with care, and with perfect frankness. We have always taken pains to express our convictions in such a way as not to discourage honest and judicious enterprises; and in case of doubt we have frequently remained silent. Thus we have never urged that the Burleigh and Marshall tunnels should be abandoned, because they were actually under way, and far advanced, before we had the opportunity to judge of their policy. What we now desire, is to prevent, if possible, the wild and reckless imitation of these examples.

The Denver *News* of April 27 contains a communication entitled "A Reply to Commissioner RAYMOND'S Article on the Burleigh Tunnel." The writer chooses to confound the editorials in this Journal with the official utterances of the Commissioner, a violation of the courtesy of public discussion which we might ascribe to ignorance, were not its purpose made evident by the opening paragraphs of his letter. By dragging the Commissioner into the debate, he is enabled to reply to the Editor in the following logical fashion:

"ROSSITER W. RAYMOND, United States Commissioner of Mining Statistics, in fulfillment of his duties, has published two reports of very doubtful value. In them that which is original bears a small proportion to the whole, and the remainder is compiled from a former report of J. Ross BROWNE, extracts from obscure newspapers, descriptions of machinery culled from encyclopedias, accounts of foreign mining schools, and laws not at all relative to the purposes for which he was employed. If the authorities at Washington are satisfied with such meagre and unsatisfactory results, and consider them worth the large outlay for publication, those who have a real interest in the subject must possess their souls in patience and wait a change in the Commissionership for information of value. There is yet to be found the first individual from any mining district who will acknowledge obtaining any information of importance from the two reports, and the newspapers from the mining region with one accord condemn them. If Mr. RAYMOND would rest content with these useless, harmless productions, we would do nothing to disturb his serenity; but when he uses his position and power to injure private enterprise, when he makes a labored effort to prevent the development of the principal mining region of Colorado, it is our duty to examine into his antecedents and ascertain what he has ever said or done to make him an authority on mining subjects."

Candor compels us to add that the Denver *News*, in publishing the above, disclaims the writer's opinions on this point, in words very complimentary of the Commissioner. But the *News* adds a complaint of the course of this paper with regard to Colorado, as "too often doubting in its statements, insinuating in its remarks, and captious in its criticism," and "displaying a spirit that was neither truly friendly nor openly hostile." The profound criticism of Mr. RAYMOND'S reports may well torment the soul of that gentleman, but we shall not allow it to vex ours. But we are touched somewhat by the accusation of the *News*, and we respectfully ask that really well-informed and generally impartial journal to specify our sins in this regard. Our own files show that we have given more editorial notice to Colorado than to any other mining State or Territory in the Union; that we have praised freely every good thing that we could find in its history, and that we have steadily expressed our high opinion of the mineral resources, the unsurpassed geographical advantages, and the solid (though slow) progress of the Territory in mining industry. Year after year, we recognize the evidences of a real improvement, and are glad enough to note them.

But, on the other hand, no intelligent man can ignore the history of combined blundering and swindling in the mines of Colorado. It is the simple truth that this Territory has not been developed as successfully as its great natural advantages led us to expect. In common with many others, we were enthusiastic once in our prediction of speedy and glorious prosperity for Colorado; but we made the mistake of judging from natural advantages alone, and leaving men out. We are somewhat wiser now; and in our predictions of the future we make large deductions for human folly.

Let us give notice once for all, that the ENGINEERING AND MINING JOURNAL will not be prevented by abuse, nor even by the grief of newspapers in the mining region, from speaking its mind. At the same time, our columns are open to statements from persons aggrieved, and to arguments against our own opinions. If the anonymous writer in the *News* were as desirous as he pretends to be, that our article should not "produce a damaging effect," he would have addressed a reply to us. Unfortunately he would in that case have been obliged to do two disagreable things, namely, omit Mr. RAYMOND'S name, and furnish his own. He would not have been allowed to parade personalities and conceal personality.

We are, not rhetorically but really, anxious that our article shall do no damage, except to pernicious hallucinations. Especially do we desire to avoid injuring the reputation or the business of Mr. BURLEIGH, whom without personally knowing we highly esteem, and whose rock-drilling machine is a good thing. We have just returned from a journey to the Nesquehoning tunnel in Pennsylvania, where we went to study this apparatus in actual operation; and we can bear witness to its exceeding efficiency there. But nothing that we can say in Mr. BURLEIGH'S praise will satisfy our critic. With such minds, a single condemnatory view outweighs a volume of praises; a hostile criticism is of course disingenuous and malicious, and the only way to meet it is to asperse the character of its supposed author.

The writer premises: "Take from the community all faith in mining around Georgetown and through tunnels, and the effect upon the Territory will be crushing." As Georgetown and vicinity produce about one-tenth of the bullion coming from Colorado, and as the tunnels of Colorado have never produced anything, perhaps this view may be considered exaggerated. But what we desire to to "take away" is faith in prospecting by deep cross-tunnels, and what we desire to see "crushed" is more quartz, and less of human hope and labor.

The writer objects to our allusion to the cost of the Burleigh tunnel. On this subject he is far better informed than we are; but we shall not give any estimates, because the circumstances of the case were such as to make the cost excessive; and its publication would not be fair to Mr. BURLEIGH'S drill. If he chooses to inform the public how much he has expended in the matter, he can do so.

Our critic declares:

"The assertion that at the present time there are plenty of shafts in Colorado five hundred feet deep, shows too great ignorance on the part of the United States Commissioner of Mining Statistics. Let him enumerate them, and if they number the fingers on one of his hands, them we will make him an ample apology."

The mining commissioner has, we believe, four fingers on "one of his hands;" but we will throw in the other hand, and both thumbs, and call attention to the following list of Colorado shafts, which does not exhaust the number, but may entitle us to the ample apology promised.

Trust.....	540 feet	Sterling.....	530 feet
Black Hawk....	576 "	Black Hawk 2d sh.	531 "
Ophir.....	600 "	Ophir 2d sh.....	600 "
Bobtail.....	500 "	Sensenderfer.....	500 "
First National..	500 "	Stalker & Stanley.	500 "

The average depth of the mines on the Bobtail, the Gunnell, and nearly half of the Gregory, is 500 feet. We invite our critic to study the juvenile game: "How many fingers do I hold up?"

He complains of the disingenuousness of "Mr. RAYMOND'S article," because a stranger reading it would suppose the tunnel had been run to cut one vein,

"whereas, the object was to cut a series of veins which are opened and developed on the surface, the owners of which had invited Mr. BURLEIGH'S coöperation to develope their properties, on terms probably satisfactory to both parties. Before another year has passed, many of these exceedingly rich veins will be cut, adding tenfold to the value of the properties as they now stand. This is the inference from the vein already cut. Why should Mr. RAYMOND use his prominent position to dampen the ardor of those who have shown so much faith and pluck?"

We trust Mr. BURLEIGH'S arrangements with surface owners are indeed such as will be satisfactory to him. For unfortunately there are no real tunnel-rights in American mining law, and whatever return he gets from those whose property he increases "tenfold" in value, must be got by private arrangements. But the vein already cut, we sincerely hope, belongs to nobody on top. It would be poor consolation to have increased its value tenfold, if the increase must go into somebody else's pocket. According to this writer it will, "with suitable reduction works, pay a good dividend annually on one million dollars." This fact we did not know when we wrote our article. At this distance from Colorado, it has always been difficult to tell before mines were opened whether they would pay dividends. But now that we are informed, we are more desirous than ever that the discovery shall belong to the party furnishing the money, skill and perseverance.

The mining regulation in Colorado as to tunnels is cruelly unjust. According to this writer, it gives 250 feet on each side of the tunnel on each vein cut that is not known to be a prior discovery. And the tunneler can be ejected from a vein like any other trespasser, whenever it is proved to be within a prior claim.

"But," says our wise-acre, "the short distance allowed by law to the tunnels would be readily given by any possessor of three thousand feet, to parties demonstrating the existence of their veins in paying quantity at that depth." We venture to recommend that the possessor aforesaid be in all cases requested to put that slight concession in writing beforehand. For ourselves, if we owned a ledge, and somebody cut it in depth for us, at a rich spot, we should prefer giving away any other five hundred feet on it than that particular piece.

This brings us exactly to our point, which is, that one tunnel like the Burleigh, whether wisely run or not, makes all parallel tunnels within a mile unnecessary. The tunnel-sites in the cañons above Georgetown are "as thick as they can stick." Everybody proposes to go ahead with a tunnel, and thinks himself fortunate if he is in the same mountain with some other tunnel. The public-spirited owner of three thousand feet on the surface—will he give five hundred to each of the six subterranean adventurers who propose to increase the value of his lode?

In truth, the usual expectation of the tunnel-adventurer is to claim every vein he cuts, and rob it of its value before the question of real ownership can be settled. The reason why surface owners have never objected is simple enough. The tunnels have not yet done them any injury. Our epithet of "piracy," applied to this sort of mining, is met by the Denver champion with the dictionary definition, which shows that piracy occurs on the sea. WEBSTER precedes this definition with a concise synonym, "robbery"; and we might make a lively etymological defence of our use of the term, but we prefer to admit that we were wrong, that the act of undermining a surface-proprietor and "appropriating" his lode, is not piracy —because it is not committed on the sea!

The letter we have dissected concludes with an appeal to Mr. RAYMOND, if from envy, malice or personal prejudice, he de-

sires to thwart any individual enterprise, that he shall do it fairly and honestly, not by insinuations and misstatements! This comical apostrophe may perhaps console its object for the preceding castigation. It is on a par with the rhetoric of another western critic, who, after accusing the United States Commissioner of taking bribes, prostituting his office, betraying the people, stealing and lying (because he omitted to visit a certain district in a certain year) concludes: "Personally, we have no doubt, Mr. RAYMOND is a high-toned gentleman. We only refer to his official career!"

This high-toned monster of a RAYMOND we shall not defend. He may have ten fingers on one hand and break a commandment with every finger. If he does, write sharp articles about him; it will do him good. But we are more concerned with the course of the ENGINEERING AND MINING JOURNAL, and we register a very serious resolution that we mean to kill the "tunnel-fever" in Colorado if plain talk will do it. It is rank folly, and it has been stimulated and maintained in many instances by disgraceful deceit. Nobody knows this better than the editors of the Colorado newspapers. If they would come out and tell what they know, and unite with us in a sane and sober view of the case, there would be no doubt of the result.

We have not much doubt, as it is. We understand pretty well what is the influence of this journal, absolutely free as it is from all suspicion of interested motives. When we speak positively, we are listened to. When we blame severely, the stigma is not easily wiped away. We have fancied that our honest advice might be received with thanks; but if it is to meet only with abuse, no matter; it will not on that account be withheld. Facts are welcome to our columns; argument will be courteously received and weighed; all sides shall have a hearing; but our sincere convictions of truth and duty will be proclaimed, until our views are disproved, or our warnings are obeyed.

Light Telegraph Cables.

A PAPER was recently read before the British Association by Captain W. ROWETT, in which the author reviews the history of the Atlantic cables, and gives some interesting particulars concerning their weight. The cable of 1857 weighed in water one pound per fathom; in the construction of the next cable a large amount of hemp was employed, and the weight thereby reduced to twelve ounces per fathom. In laying the first cable in 2,500 fathoms of water, the strain upon the cable would be in the neighborhood of 2,500 lbs, which is about equal to the weight of the lower anchor of a 1000 ton ship, and far too great to be sustained by a cable of the size of one's finger.

Captain ROWETT favors the adoption of a cable much lighter than any at present in use, and in the support of his ideas upon the subject, quotes the experience of Captain DAYMAN, who, is of opinion that in the depths of the ocean the water is perfectly tranquil, and the bottom covered with a soft bed of ooze. In proof of this, he says that in the deepest part of the Atlantic, on one occasion, he hauled up 200 fathoms of slack line, which had coiled around the sinker and become entangled with it.

In view of these facts Captain ROWETT thinks that the weight of the cable should be reduced to one ounce per fathom. Such a cable, he says, would sink at the speed of two miles per hour, and could be run out even in tempestuous weather, and kept under as perfect control as a log line, without the cumbrous and complicated machinery now used to pay out heavy cables. The author regards hemp as the proper material for covering the electric core. This material can, he says, be soaked with a preserving solution which will make it practically indestructible, and which in contact with water becomes very hard. The employment of iron wire around the core he considers very dangerous to the insulation of the cable, and at the same time very expensive and heavy.

Another argument which the author advances in favor of his system, is that of economy, both in construction and laying. He thinks that by the adoption of light cables, messages could be profitably sent for one sixth of the present price, and ocean telegraphy thus brought within the reach of the millions of every country.

There is, no doubt, room for much improvement in ocean telegraphy, and it may be good policy to employ a lighter cable for the deep sea portions of the line, but past experience would seem to indicate that the shore ends, at all events, should be made heavier than they hitherto have been.

A Patent Steel Process.

A PATENT has just been granted to Messrs. JAY and AUGUSTIN, of Montreal, Canada, for the manufacture of cast-steel by the use of from eight to ten per cent. of nitrate of soda, the same quantity of oxide of iron and three per cent. of iron ore, which are to be added to the liquid iron in the puddling furnace.

We are not informed what the nature of the iron ore added is, or how it differs from the oxide of iron which is also mentioned. Perhaps this is a modification of the codorus ore process.

Petrifactions and Living Species.

AT a recent meeting of the London Geological Society, the President, in presenting to Mr. ROBERT ETHERIDGE one of the Wollaston prizes, thus spoke of the work of that industrious paleontologist:

"The Council of the Society has awarded to you the proceeds of the Wollaston Fund, to aid in prosecuting your valuable work on the fossils of the British Islands stratigraphically arranged. In this work, on which you have been engaged during the last eight years, and which occupies nine volumes of MS., representing as many geological groups, you give the natural history lists of each group, and trace the history of each species both in time and space. Of the magnitude of the work, few can have any idea, nor would many have an idea of the marvellous extent of past life in our small portion of the globe without a comparison of our recent fauna with those (necessarily incomplete because only partly accessible) which you have enumerated in your most useful lists. This comparison shows:

	Polyzoa. Zoophytes. Echinoderms.	Crustacea.	Mollusca.	Fishes.	Reptilia.	Birds.	Mammalia.	Plants.	Total.
Number of Species in the existing fauna and flora of Great Britain.	616	278	567	263	15	354	76	1,820	3,989
Number of Species found fossil in Gt. Britain.	2,574	746	7,091	815	224	12	172	819	12,453

"I trust that this work will not be allowed to remain in MS.; and that, presuming you will begin with the oldest, we may soon look for an instalment in the fauna of the Palæozoic rocks. I have much pleasure in presenting you with this token of the importance which the Geological Society attaches to your labors."

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114,248, antedated April 27, 1871.—WEIGHING-SCALE.—Darwin D. Allen, Adams, Mass.

114,249.—MILLSTONE-BALANCE.—John A. Althouse, New Harmony, Ind.

114,250.—WASHING-MACHINE.—Albert Assmann, Rahway, N. J.

114,251.—GRAIN-SEPARATOR.—Sidney K. Ayres, Dellton, Wis., assignor to himself and Peter Flicknor, same place.

114,252.—STALK-CUTTER.—Josiah Babcock, John F. Stilson, and James C. Leidy, Galesburg, Ill.

114,253.—SASH-HOLDER.—William Bachëller, West Newbury, assignor to himself and George P. Kimball, Boston, Mass.

114,254.—CORDING ATTACHMENT FOR SEWING-MACHINES.—Nelson Barnum, La Porte, Ind., and Russel H. Barnum, Chicago, Ill.

114,255.—AUTOMATIC BOILER-FEEDER.—Robert Berryman, Hartford, Conn., and Rufus Nutting Pratt, Philadelphia, Pa.

114,256.—FIRE-EXTINGUISHER.—Christopher Blake, Boston, Mass.

114,257.—STEAM-TRAP.—James H. Blessing, Albany, N. Y., assignor to himself and Frederick Townsend, same place.

114,258.—THILL-COUPLING.—George I. Bradley, Boston, Mass., assignor to himself and Everett W. Bigelow, same place.

114,259.—BREECH-LOADING FIRE-ARM.—Heinrich Büchner, New York, N. Y.

114,260.—BASE-BURNING STOVE.—Esek Bussey and Charles A. Hamlin, Troy, N. Y., assignors to Bussey, McLeod & Co., same place.

114,261.—INFANT'S SHOE.—Willard M. Carpenter, Rowley, Mass.

114,262.—INKSTAND.—Seth C. Catlin, Cleveland, Ohio.

114,263.—CHEESE-HOOP FLANGE.—Azer Chandler, Rome, N. Y.

114,264.—CITRATES OF IRON AND MANGANESE FOR MEDICAL PURPOSES.—Albion R. Clapp, Boston, Mass., assignor to James R. Nichols & Co., same place.

114,265.—NEEDLE-SHARPENING ATTACHMENT FOR SEWING MACHINES.—Celia P. Clark, Lock Haven, Pa.

114,266.—HOE.—Isaac Cook and John T. Bever, Haynesville, Mo.

114,267.—METER.—Thomas Cook, Old Kent Road, and John Watson, Victoria Chambers, Westminster, assignors to Fluid-Meter Company, London, England.

114,268.—PRINTING-PRESS.—Calvert B. Cottrell, Westerly, R. I.

114,269.—WHIFFLETREE-COUPLING.—Hyde Crocker, Jr., Montrose, Pa.

114,270.—RECEIVER AND STENCH TRAP FOR STREET-SEWERS.—Thomas Dark, Buffalo, N. Y.

114,271, antedated April 26, 1871.—COTTON-PRESS.—Henry J. Davis, Wetumpka, Ala.

114,272.—GAS-REGULATOR.—Otis Dean, Richmond, Va.

114,273.—PRINTERS' CASE.—Alexander T. De Puy, New York, N. Y.

114,274.—SELF-ACTING MULE FOR SPINNING.—John Dodd, Oldham, England.

114,275.—DRY-GAS PURIFIER.—Edward Duffee, Haverhill, Mass., assignor to American Gas-Screen Manufacturing Company, same place.

114,276.—TUCK-MARKER FOR SEWING-MACHINES.—George L. Du Laney, New York, N. Y.

114,277.—MANUFACTURE OF IRON AND STEEL.—Zohette S. Durfee, New York, N. Y.

114,278.—EVAPORATOR.—Stephen P. Dyer, Ankney Town, Ohio.

114,279.—STOVE-PIPE SHELF.—James P. Elliott, Bridgeport, Conn.

114,280.—TUBULAR GRATE-BARS.—William H. Farris, Cairo, Ill.

114,281.—NIPPLE-SHIELD.—Samuel C. Foster, New York, N. Y., assignor to The Monitor Shield Company.

114,282.—INVALID-CHAIR.—George T. Fowler, East Somerville, Mass.

114,283.—HYDRANT.—Joseph P. Gallagher, St. Louis, Mo.

114,284.—PUMP.—Joseph P. Gallagher, St. Louis, Mo.

114,285.—PRINTING-PRESS.—Merritt Gally, Rochester, N. Y.

114,286.—ROOK-BINDING MACHINE.—John Glass, Green Point, assignor to George H. Sanborn, Brooklyn, N. Y.

114,287.—MANUFACTURE OF RUBBER.—John Greacen, Jr., New York, N. Y.

114,288.—SPINNING-MULE, &c.—Peter William Greenwood, Landenburg, near Avondale, Pa.

114,289.—SLATE-FRAME.—Wesley W. Hamilton, Flushing township, N. Y.

114,290.—STOVE-GRATE.—Charles R. Harvey and James H. Foote, New York, N. Y., assignors to Charles R. Harvey.

114,291.—DRAUGHT-PROMOTER.—Benjamin A. Haycock, Richmond, Iowa.

114,922.—CRIB OR CRADLE.—William T. Hazard, Randolph, Mass.

114,923.—DISTILLING HYDROCARBON OIL.—Samuel A. Hill and Charles F. Thumm, Oil City, assignors to themselves and Oliver P. Scaife, Pittsburg, Pa.

114,294.—SEWING-MACHINE.—James A. House and Henry A. House, Bridgeport, Conn., assignors to "Wheeler & Wilson Manufacturing Company," same place.

114,295, antedated April 15, 1871.—APPARATUS FOR EVAPORATING LIQUIDS.—John Howarth, Salem, Mass.

114,296.—ENGINE-GOVERNOR.—Reuben K. Huntoon, Boston, Mass.

114,297.—COMBINED PUNCHING AND SHEARING-MACHINE.—William H. Ivens and William E. Brooke, Trenton, N. J.

114,298.—MODE OF LUBRICATING AXLES.—James Ives, Mount Carmel, Conn.

114,299.—MANUFACTURE OF CAST-STEEL.—Pierre Eymard Jay and John Augustin Rafter, Montreal, Canada.

114,300.—STEAM-ENGINE.—Asa Johnson, Brooklyn, N. Y., assignor to himself and William H. Johnson, same place.

114,301.—APPARATUS FOR MANUFACTURE OF PAPER-PULP.—Morris L. Keen, Jersey City, N. J., assignor to himself and Samuel A. Walsh, New York city.

114,302.—LAMP-COLLAR.—Henry Kelley and William H. Locke, Boston, Mass.

114,303.—MACHINE FOR CRUSHING AND GRINDING ROCKS, PHOSPHATES, &c.—Frederick J. Kimball, Philadelphia, Pa.

114,304.—APPARATUS FOR DRYING PHOSPHATES.—Frederick J. Kimball, Philadelphia, Pa.

114,305.—WASHING-MACHINE.—James Munroe Kimball, Woodstock, Ill.

114,306.—CHURN.—John J. Kimball, Napierville, Ill.

114,307.—WEFT-FORK FOR LOOMS.—Jacob Haskell Knowles, Lawrence, Mass.

114,308.—STALK-CUTTER.—Miles K. Lewis and Joseph Munger, Malcom, Iowa.

114,309.—WINDMILL.—Giles Mabie and Thomas C. Little, Dixon, Ill.; said Mabie assigns his right to said Little.

114,310.—BELT-SHIPPING DEVICE FOR SELF-ACTING MULES.—Hezekiah Macon, Providence, R. I., assignor to Joshua Hunt, same place.

114,311.—MACHINE FOR CUTTING AND BENDING SHEET METAL.—Jones R. Maitland, Little Rock, Ark.

114,312.—COAL AND WOOD-BOX.—John Mallin, Chicago, Ill.

114,313.—THRASHING-MACHINE.—Martin H. Mansfield, Ashland, Ohio.

114,314.—BIT-STOCK.—Charles Manson, Boston, Mass.

114,315.—CORPSE-PRESERVER.—Mahlon R. Margerum, Trenton, N. J., assignor to Benjamin L. Disbrow and James G. Van Cleeve, same place.

114,316.—CARBURETER FOR AIR AND GAS.—Louis Marks, San Francisco, Cal.

114,317.—LUBRICATOR.—Cotton Mather, Steubenville, Ohio.

114,318.—HAME.—Asa McCracken, South Byron, N. Y.

114,319.—EXTENSION-TABLE.—Frederick Menzer, Flint, Mich., assignor to himself and William Tracey, same place.

114,320.—Canceled.

114,321.—BARREL-MACHINE.—William R. Middleton and Edward Middleton, Cleveland, Ohio.

114,322.—SHINGLE-MACHINE.—Uriah D. Mihills, Fond du Lac, Wis.

114,323.—SHEET-METAL MATCH-SAFE.—Joseph Musgrove, Newark, N. J.

114,324.—SAND-CAP FOR HUBS OF VEHICLES.—George H. Nevens, Liverpool, Cal., assignor to himself and R. N. Caughell, same place.

114,325.—ROOFING COMPOSITION.—Eliakim P. Newton, Clintonville, Pa.

114,326.—MILLSTONE DRESSING-GUIDE.—John North, New York, N. Y.

114,327.—IMPLEMENT FOR ALLURING HAT-BODIES.—Jay Northrop and James F. Emmons, Bridgeport, Conn.

114,328.—APPARATUS FOR LIFTING LOCOMOTIVES, TRUCKS, AND RAILROAD CARS.—Grafton T. Nutter, Jersey City, N. J.

114,329.—PROTECTOR FOR GAS OR VAPOR-BURNERS.—Rufus Nutting, Randolph, Vt.

114,330.—COFFEE-ROASTER.—Augustin Obst, Cambridgeport, Mass.

114,331.—HAND CORN-SHELLER.—Charles Melsom O'Hara, Cincinnati, Ohio.

114,332.—MANUFACTURE OF SPLIT NEEDLES.—Charles H. Palmer, New York, N. Y.

114,333, antedated April 22, 1871.—TACKLE-BLOCK.—Isaac E. Palmer, Hackensack, N. J.

114,334.—PLOW.—William F. Parker, Troy, Ala., assignor to himself, John B. Goldthwaite, and William H. Fryer, same place.

114,335.—COAL-SCUTTLE.—James Cas Parrish, Petersburg, Va.

114,336.—COOKING-STOVE AND RANGE.—John S. Peckham, Utica, N. Y.

114,337.—RUBBER PLAY-PIPE FOR HOSE.—Edward L. Perry, New York, N. Y., assignor to Combination Rubber Company, same place.

114,338.—STOP-COCK VALVE.—George Pierce, Boston, Mass.

114,339.—HYDRAULIC APPARATUS.—Phineas Franklin Powers, Genoa, Nev.

114,340.—BOOTS AND SHOES.—William F. Prusha and Elisha L. Wales, Marlborough, Mass., assignors to themselves and Lewis A. Howe, same place.

114,241.—POLISHING-MACHINE.—Peter F. Randolph, Jerseyville, Ill.

114,342.—CHIMNEY-TOP.—William Richards, London, England.

114,343.—ANIMAL AND GAME-TRAP.—James H. Richardson, Westport, Mo.

114,344.—SLIDE-VALVE.—Alexander K. Rider, New York, N. Y., assignor to himself, Cornelius H. Delamater, and George H. Reynolds, same place.

114,345.—CLOTHES-LINE PROTECTOR AND STRETCHER.—William J. Ripley, Cincinnati, Ohio.

114,346, antedated April 28, 1871.—SAW-GUIDE.—Aaron Rittenhouse, Smithville, Ohio.

114,347.—PLUMBER'S WATER-BOILER.—Alexander R. Robb, Brooklyn, N. Y.

114,348.—PIPE-WRENCH.—Eugene H. Robbins, Pittsfield, Mass.

114,349.—RAILROAD-CAR HEATER.—Henry R. Robbins, Baltimore, Md.

114,350.—PAPER-CUTTING MACHINE.—Thomas C. Robinson, Boston, Mass., assignor to George H. Sanborn, Brooklyn, N. Y.

114,351.—DUST-PAN.—Thomas F. Rooney, Chicago, Ill.

114,352.—SMOKING-TOBACCO.—Albert S. Rosenbaum, New York, N. Y.

114,353.—CAR-COUPLING.—Samuel S. Sartwell, Camden, N. Y.

114,354.—LEATHER-POLISH.—Henry A. Sawyer and Ramsom G. Sawyer, Milwaukee, Wis.

114,355.—BIRD-CAGE MATS.—Charles S. Schenck, New York, N. Y.

114,356.—MACHINE FOR CHARGING IRON FURNACES.—Edward G. Scovil, St. John, Canada.

114,357, antedated April 26, 1871.—SLED-KNEE.—Calvin Shaw, Milledgeville, Pa.

114,358.—GAS-MACHINE.—Warren A. Simonds, Boston, Mass.

114,359.—MACHINE FOR CUTTING STAVES.—William Sisson, Fulton, N. Y.

114,360.—GROCER'S CANISTER.—William H. Smith, Portland, Conn., assignor to The Heath & Smith Manufacturing Company, same place.

114,361.—OIL-TANK.—Henry F. Snyder and George S. Snyder, Williamsport, and Autes Snyder, Freeport, Pa.

114,362, antedated April 27, 1871.—GARDEN-SPRINKLER.—John I. Spear, San Francisco, Cal.

114,363.—BRIDGE.—Charles B. Sreeves, Atchison, Kan.

114,364.—CARRIAGE-HUB.—Henry W. Stow, New Haven, Conn.

114,365, antedated April 22, 1871.—SCAFFOLD-BRACKET FOR ROOFING.—John W. Tallmadge, Plainville, Conn.

114,366.—CHILDREN'S BIB.—Adaline L. Thomson, Hudson City, N. J.

114,367.—DISH-WASHER.—Henry B. Todd, Plymouth, Conn.

114,368.—HORSE HAY-RAKE.—Robert M. Treat, Morris, Conn.

114,369.—WHEEL FOR TRACTION-ENGINES.—Charles W. Tremain, Chicago, Ill.

114,370.—LUNCH-BOX.—Daniel Troxell, Newark, N. J.

114,371, antedated April 27, 1871.—MOLD FOR MAKING CUSHIONED BELTING.—Samuel W. Tyler, Troy, N. Y.

114,372.—PALLET OF WATCHES.—Arthur Wadsworth, Newark, N. J.

114,373.—FABRIC FROM WASTE LEATHER.—Enoch Waite, Franklin, Mass., assignor to himself and Francis B. Bay, same place.

114,374.—LOCK FOR DOUBLE-BARRELED FIRE-ARMS.—Daniel B. Wesson, Springfield, Mass.
114,375.—MERCURIAL SALVE.—Walter Wheelock, Boston, Mass.
114,376.—TILTING-CHAIR.—Edwin R. White, Milford, Mass.
114,377.—ROLL FOR ROLLING UMBRELLA-CONNECTIONS.—Edwin Wight, Philadelphia, Pa.
114,378.—COMBINED SQUARE, BEVEL, PLUMB, AND GAUGE.—Milton M. Wilson, Elwood, N. J., assignor to himself and James H. Curl, same place.
114,379.—DOOR-SPRING.—Loren R. Witherell, Galesburg, Ill., assignor to Davis A. Dudley and Edward D. Dudley, same place.
114,380.—WASHING-MACHINE.—Jacob A. Wood, Chemung, Ill.
114,381.—WIND-WHEEL.—Horace Woodruff, Sandwich, Ill.
114,382.—PROPELLER FOR CANAL BOATS.—George G. Wyland and Thomas M. Rathmell, Williamsport, Pa.
114,383.—BOLT-CUTTER.—William E. Yeager, Lawrence, Kansas.
114,384, antedated April 18, 1871.—CUP FOR GRAIN-DRILLS, &c.—John P. Zeller, South Bend, Ind.
114,385, antedated April 22, 1871.—MACHINE FOR SHEARING METAL.—William J. Adams, Grand Rapids, Mich.
114,386.—PADLOCK.—William H. Akins, Ithaca, and Henry E. Abell, Brooklyn, N. Y.
114,387.—BINDER FOR SEWING-MACHINES.—William Allebaugh and Joseph M. Cuffell, Norristown, Pa., assignors to Jacob C. Slemmer, same place.
114,388.—KITCHEN-KNIFE.—Jacob W. Androvatt and Truman W. Joline, Tottenville, N. Y.
114,389.—SELF-LIGHTING LAMP.—William W. Batchelder, Boston, Mass.
114,390.—CORN-PLANTER.—Henry Baughman, Sandusky, Ohio.
114,391.—HORSE HAY-FORK.—Charles Bean, Pawtucket, R. I.
114,392, antedated April 28, 1871.—STABLE FIXTURE.—Samuel S. Bent, Port Chester, N. Y.
114,393.—SOAP.—John T. Bever and Pauline S. Bever, Lathrop, Ill.
114,394.—VULCANIZED-RUBBER TUBE FOR GRAIN-DRILLS, &c.—James R. Bird, Brooklyn, N. Y., assignor to The New York Rubber Company, New York city.
114,395.—DITCHING-MACHINE.—Isaac Boas, New Orleans, La.
114,396.—MACHINE FOR PREPARING BEEF-STEAK.—Asa M. Bond, Concord, N. H.
114,397.—KNITTED FABRIC.—Henry Boot, Philadelphia, Pa., assignor to Thomas Dolan, same place.
114,398.—ROLLER-SKATE.—Peter R. Borein, San Leandro, Cal.
114,399.—SAFETY DEVICE FOR HOISTS.—Peter J. Borger, Cincinnati, Ohio.
114,400.—MACHINE FOR THE TREATMENT OF FIBROUS PLANTS.—Adolph Bouchard, New Orleans, La.
114,401.—BRIDGE.—Thomas Charles Boutet, Paris, France.
114,402.—SHAFT-COUPLING.—Sidney Broadbent, Scranton, Pa.
114,403.—PUMP.—Addison P. Brown, New York, N. Y.
114,404.—SAFETY ATTACHMENT FOR POCKET-BOOKS.—Jefferson Brown, Jr., New York, N. Y.
114,405.—MANUFACTURE OF WHITE LEAD.—Thomas H. Burridge, St. Louis, Mo.
114,406.—ELECTRO-MAGNETIC BURGLAR-ALARM.—John G. Butler, Glen's Falls, N. Y.
114,407.—CORPSE-PRESERVER.—Jeremiah T. Carpenter, Downington, Pa.
114,408.—REAPING-MACHINE.—George Homer Clark, Cleveland, Ohio, assignor to himself and Peter B. Reid, Lockport, N. Y.
114,409.—RAILWAY FROG AND RAIL-COUPLING.—John W. Close, Buffalo, N. Y.
114,410.—BILLIARD-TABLE CUSHION.—Hugh W. Collender, New York, N. Y.
114,411.—LIQUID-METER.—Thomas Cook, New York, N. Y.
114,412.—VENTILATING-ROLLER WINDOW-BLIND.—Arthur Cooper, Twickenham, England.
114,413.—HORSESHOE-NAIL MACHINE.—Harley Dwight Cowles and George Stacy, Montreal, Canada.
114,414.—BRIDGE-GATE.—Edward Richard Coyne, Chicago, Ill.
114,415.—WATER-METER.—Joseph W. Cremin, New York, N. Y., assignor of one-half his right to George H. Fairchild, Bridgeport, Conn.
114,416.—FANNING-MILL.—Lewis M. Crosby, Ashtabula, Ohio.
114,417.—RAISIN-SEEDER.—Willie Curtis, Jr., Wolcottville, assignor to Elisha Turner, same place.
114,418.—TOILET-CASE.—Francis E. Dapron, Davenport, Iowa.
114,419.—WATER-METER WITH STOP-COCK CONNECTIONS.—José F. de Navarro, New York, N. Y.
114,420.—LIQUID-METER.—José F. de Navarro, New York, N. Y., and Henry C. Sergeant, Newark, N. J., assignors to José F. de Navarro.
114,421.—FIRE-ESCAPE.—William De Pew, Paris, Canada.
114,422.—CUPOLA-FURNACE.—James Dougherty, Philadelphia, Pa.
114,423.—MACHINE FOR MIXING PASTE FOR CONFECTIONERY, &c.—Robert Duff, New York, N. Y., assignor to Ernest Greenfield and Philip Strauss, same place.
114,424.—SEWING-MACHINE.—George L. Dulaney, New York, N. Y.
114,425.—MACHINE FOR DRESSING MILL-STONES.—Samuel East, Memphis, Mich.
114,426.—SAW-MILL.—Marshal J. Egery, Bangor, Me., and Thomas N. Egery, same place.
114,427.—PISTON-PACKING.—Philip Estes, Leavenworth, Kan.
114,428.—DIVISION-PLATE FOR COOKING-STOVES.—Selena C. Ewing, Hill's Ferry, Cal.
114,429, antedated April 26, 1871.—STEAM-ENGINE.—Hippolyte Fontaine, Paris, France.
114,430.—COUNTERPOISE GUN-CARRIAGE.—John G. Foster, Boston, Mass.
114,431, antedated April 25, 1871.—WASH-BOILER.—James H. Garner, Pontiac, Ill.
114,432.—LANTERN.—Nathaniel Gear, Newark, Ohio.
114,433.—RAIL-JOINT.—William F. Grassler, Muncy, Pa.
114,434.—DRY-EARTH CLOSET.—William Henry Grove, Philadelphia, Pa.
114,435.—SEWING-MACHINE STAND.—William Henry Grove, Philadelphia, Pa.
114,436.—SUPPORT FOR THE SASHES OF CARRIAGE-DOORS AND WINDOWS.—John C. Ham, New York, N. Y.
114,437.—RETURN-FLUE BOILER-FURNACE.—Charles J. Harris, Bloomington, Ill.
114,438.—MANUFACTURE OF CANDLES.—Charles Havard, New York, N. Y.
114,439.—CONSTRUCTION OF BEDSTEADS.—John F. Hollister, Piano, Ill.
114,440.—STEAM-HEATER.—Albert L. Ide, Springfield, Ill.
114,441.—HARVESTER-RAKE.—Benjamin Illingworth, Le Roy, Minn.
114,442.—BOBBIN-WINDER FOR SEWING-MACHINES.—Thomas Masterson Jeaks, New York, N. Y.
114,443.—SHINGLE-MACHINE.—Joseph Jimo, Vergennes, Vt., assignor to himself and E. H. Landon, same place.
114,444.—POTATO BAKING-PAN.—Amos Jones, Lebanon, N. H.
114,445.—SASH-HOLDER.—George N. Kendall, Wooster, Ohio.
114,446.—AWL.—Thomas Kenney, Lynn, Mass.
114,447.—ELECTROTYPE-MOLD.—Silas P. Knight, Brooklyn, N. Y.
114,448.—WAGON-TONGUE SUPPORT.—John Krehbiel, Williamsville, N. Y.
114,449.—MANUFACTURE OF FIRE-BRICKS.—Balthasar Kreischer, New York, N. Y.
114,450.—SELF-EXTINGUISHING SAFETY-CAN FOR COMBUSTIBLE MATERIALS.—William H. Lawrence, Williamsburg, N. Y.
114,451.—MATCH-HOOK.—Joseph D. Leach, Penobscot, Me.
114,452.—MECHANISM FOR ADJUSTING AND SECURING CAR-WHEELS TO AXLES.—George Granville, Lobdell, Wilmington, Del.
114,453.—STOVE-DAMPER.—Ernest Lobsand, La Porte, Ind.
114,454.—SECURING DENTAL FILLINGS.—Charles H. Mack, Portland, Oregon.
114,455.—SPINDLE STEP-BOX.—Lewis Maish, Minneapolis, Minn.
114,456.—FRUIT AND BERRY-BOX OR BASKET.—Joshua H. Marvil, Laurel, Del.
114,457.—WASH-BOILER.—David McCleary, Allegheny City, Pa.
114,458.—WHEEL FOR VEHICLES.—Robert W. McClelland, Springfield, Ill., assignor to himself and John McCreery, same place.
114,459.—SAIL-HANK.—William E. Meyer, New York, N. Y.
114,460.—ELEVATOR.—Charles E. Moore, Boston, assignor to himself and Martin L. Wyman, Melrose, Mass.
114,461.—BUCKLE.—John H. Morris, Paxton, Ill.
114,462.—WASHER AND WRINGER COMBINED.—Jessie H. Murray, Kirkwood, N. Y.
114,463.—GRAIN-SEPARATING AND CLEANING ATTACHMENT TO THRASHING-MACHINES.—William A. Myers, York, Pa.
114,464.—WASHING-FLUID.—Edward Henry Neill, San Francisco, Cal., assignor to himself and Emlem Painter, same place.
114,465.—PUDDLING-FURNACE.—John Neville, Brooklyn, N. Y.
114,466.—SLEIGH-HEATER.—Alfred Norton, Kokomo, Ind.
114,467.—NOZZLE-STOPPER FOR OIL-CANS.—Josiah H. Noyes, Abington, Mass.
114,468.—MACHINE FOR ROLLING LOZENGE AND OTHER PASTES.—Charles A. Oehl, New York, N. Y., assignor to Ernest Greenfield and Philip Strauss, same place.
114,469.—CHILL FOR PLOW-CASTINGS.—James Oliver, South Bend, Ind.
114,470.—ENAMELING BOOT AND SHOE-HEELS.—Charles Henry Orcutt, Leominster, Mass.
114,471.—LANTERN.—John Orphy, Buffalo, N. Y., assignor to Horace Parmelee and William H. Bonnell, same place.
114,472.—COMBINED PLOW AND MARKER.—Orlando M. Pond, Independence, Iowa.
114,473.—LUBRICATOR FOR CAR-WHEELS.—James M. Porter, Frostburg, Md.
114,474, antedated April 25, 1871.—NUT-LOCK.—Peter F. Randolph, Jerseyville, Ill.
114,475.—LIFE-PRESERVING TRUNK.—Lawrence Rebstock, Hollidaysburg, Pa.
114,476.—FIRE-BENDING MACHINE.—George J. Riblet, Boothe-ville, W. Va.
114,477, antedated April 27, 1871.—HAIR-CLIPPING DEVICE.—Frederick Charles Richardson, New York, N. Y., assignor to himself and William Hellins, Hudson City, N. J.
114,478.—CHURN-DASHER.—Julius M. See, Griffin, Ga.
114,479.—BRIDGE.—Jacob Seebold, Kantz, Pa.
114,480.—LIQUID-METER.—Henry C. Sergeant, Newark, N. J., assignor to Jose F. de Navarro, New York city.
114,481.—BOTTOM FOR SHEET-METAL WARE.—Henry W. Shepard, Mannsville, N. Y.
114,482.—APPARATUS FOR ATOMIZING LIQUIDS.—Asahel M. Shurtleff, Boston, Mass.
114,483.—CULTIVATOR.—Matthew P. Simpson, Rosemond, Ill.
114,484.—STOVE-PIPE THIMBLE.—Henry G. Smith, Meriden, Conn., assignor of one-half his right to Elijah D. Castelow, same place.
114,485.—TRUNK.—Joseph Stanton, Buffalo, N. Y., assignor to himself and Adolphus Hagelin, same place.
114,486, antedated April 22, 1871.—CONCENTRATOR.—William C. Stiles, Nevada City, Cal.
114,487.—SNAP-HOOK.—Ole O. Storle, North Cape, assignor to himself and Stamm Brothers, Milwaukee, Wis.
114,488.—MOLD FOR SADDLE-TREES.—Jacob Straus, St. Louis, Mo.
114,489.—COMBINED BLOWER AND ROTARY ENGINE.—Hanson P. Tenant, Germantown, Ind.
114,490.—FABRIC FOR CUFFS.—Hiram Howard Thayer and William Henry Hart, Jr., Philadelphia, Pa.
114,491.—AUTOMATIC FAN.—Benjamin D. Thompson, New York, N. Y.
114,492.—PREPARATION FOR CLARIFYING COFFEE.—Charles L. Tucker, Chicago, Ill.
114,493.—HARVESTER.—Benjamin G. Turner, Fremont, Neb.
114,494.—CURTAIN-FIXTURE.—Elisha Turner, Wolcottville, Conn.
114,495.—CARRÉ ICE-MACHINE.—Albert Vaass and Franz Littmann, Halle, Prussia.
114,496.—HAY-ELEVATOR.—James M. Van Demark and Moses Barlow, Phelps, N. Y.
114,497.—DRAUGHT-REGULATOR FOR STOVES.—William W. Waddell, Hillsborough, Ohio.
114,498.—MACHINE FOR ROLLING HOE-BLANKS.—Hervey Waters, Boston, Mass.
114,499.—KILN.—Gustavus A. Wedekind and Helmuth Duebberg, Baltimore, Md.
114,500.—GRAIN-SEPARATOR.—Henry L. Whitman, St. Louis, Mo.
114,501.—LAWN-MOWER.—Aaron White Cook Williams, London, England.
114,502.—COMPOSITION FOR MANUFACTURE OF SODA-WATER.—Jackson B. Wood, Richmond, Va.
114,503.—STEAM-BOILER.—Frederick A. Woodson, Selma, Ala.
114,504.—PAPER-FILE.—Solomon W. Young, Providence, R. I.
114,505.—WRENCH.—Aury G. Coes, Worcester, Mass.
114,506.—STEAM PUMPING-ENGINE.—Lucius J. Knowles, Worcester, Mass.
114,507.—STEAM-PUMP.—Lucius J. Knowles, Worcester, Mass.
114,508.—APPARATUS FOR TREATING ANIMAL MATTER FOR FERTILIZERS.—Pascal A. Hogel, New York, N. Y., assignor to Effingham H. Nichols, same place.
114,509.—MEAT-SAW.—Patrick J. Hogan and Adam Sowden, Cincinnati, Ohio.

REISSUES.

4,359.—COMBINED STOVE-LID AND DAMPER.—William Doyle, Albany, N. Y.—Patent No. 88,861, dated May 11, 1869.
4,360.—PRESERVING WOOD RAILROAD TIES, &c.—Benjamin S. Foreman, Morrison, Ill.—Patent No. 43,197, dated June 21, 1864; reissue No. 1,951, dated May 9, 1865.
4,361.—OIL-CUP.—John Peter Haines, New York, N. Y.—Patent No. 92,820, dated July 20, 1869.
4,362.—SAD AND FLUTING-IRON.—Frederick Myers, New York, N. Y.—Patent No. 112,482, dated March 7, 1871.
4,363.—PROCESS OF OBTAINING BRIGHT COLORS UPON CLOTH BY PRINTING.—Alfred Paraf, New York, N. Y., assignor to Edward S. Renwick, trustee.—Patent No. 95,040, dated September 21, 1869.
4,364.—CONCRETE PAVEMENT.—John J. Schillinger, New York, N. Y.—Patent No. 105,599, dated July 19, 1870.
4,365.—METAL CORNER-PIECE FOR PROTECTING THE CORNERS OF WOODEN BODIES.—Edwin A. Stratton and Charles M. Stratton, Greenfield, Mass.—Patent No. 100,463, dated March 1, 1870.
4,366.—APPARATUS AND PROCESS OF DISTILLING PETROLEUM AND OTHER OILS.—Augustus H. Tait and Joseph W. Avis, New York, N. Y., assignors, by mesne assignments, to Charles Pratt, same place.—Patent No. 53,359, dated March 20, 1866.
4,367.—APPARATUS FOR DISTILLING PETROLEUM AND OTHER HYDROCARBONS.—Augustus H. Tait and Joseph W. Avis, New York, N. Y., assignors, by mesne assignments, to Charles Pratt, same place.—Patent No. 63,115, dated March 19, 1867.
4,368.—RAILWAY CATTLE-CAR.—The National Cattle-Car Company, Salem, Ohio, assignee of John B. Shafer, deceased.—Patent No. 29,409, dated July 31, 1860.
4,369.—PACKAGE FOR LARD.—Charles L. Tucker, Chicago, Ill.—Patent No. 66,368, dated July 2, 1867; reissue Nos. 3,037 and 3,038, dated July 14, 1868.

DESIGNS.

4,853.—BRACKET.—John H. Bellamy, Charlestown, Mass., assignor to Elbridge Wolcott and Jonas C. Young, same place.
4,854.—FRONT OF A CATCH-ALL.—John H. Bellamy, Charlestown, Mass., assignor to Elbridge Wolcott and Jonas C. Young, same place.
4,855.—GATE-HINGE.—Charles B. Clark, Buffalo, N. Y.
4,856.—BOTTLE.—William A. Demuth, New York, N. Y.
4,857.—CHAIN-LINK.—Virgil Draper, Attlebarough, Mass., assignor to Oscar M. Draper, same place.
4,858.—HANDLE-CAP FOR SATCHELS.—George Havell, Newark, N. J.
4,859.—PALM AND BACK PIECES OF GLOVES.—Frederick E. Hotchkiss, Gloversville, N. Y.
4,860.—KNITTED TRIMMING.—Martin Landenberger, Philadelphia, Pa.
4,861.—RUBBER SHOE.—Christopher Meyer, New York, N. Y.
4,862.—RUBBER SHOE.—Christopher Meyer, New York, N. Y.
4,863.—MUFF AND COLLAR-BOX.—Raphael Moritz Seldis, New York, N. Y.
4,864.—WOVEN CLOTH.—Royal C. Taft, William B. Weeden, James W. Taft, Providence, R. I.
4,865.—RE-ENFORCING THUMB-PIECE FOR GLOVES.—Isaac B. Whipple, Gloversville, N. Y.
5,866.—BOW-INSTRUMENT.—Lucius Parmalee Wildman, Danbury, Conn.

TRADE-MARKS.

231.—TOBACCO.—Louis Lee Armistead, Lynchburg, Va.
232.—BALM.—Demas Barnes, Brooklyn, N. Y.
233.—LINIMENT.—Demas Barnes, Brooklyn, N. Y.
234.—INSECT-POWDER.—Demas Barnes, Brooklyn, N. Y.
235.—PREPARATION FOR THE HAIR.—Demas Barnes, Brooklyn, N. Y.
236.—BILLIARD CUSHION.—Hugh W. Collender, New York, N. Y.
237.—JEWELRY.—William M. Elias & Brother, New York, N. Y.
238.—MEDICINE.—Thomas S. Hodgson & Co., McKeesport, Pa.
239.—TWINE, WARP, YARN, &c.—Ezra W. Keeler, Yardville, N. J.
240.—TEA.—C. Adolphe Low & Co., San Francisco, Cal.
241.—WHISKY.—Mills, Johnson & Co., Cincinnati, Ohio.
242.—BILLIARD-TABLE.—Phelan & Collender, New York, N. Y.
243.—WOOD PUMP.—Rich & Burlingham, New York, N. Y.
244.—CIGAR.—Smith, Crosby & Co., New York, N. Y.
245.—FERTILIZER.—Smith & Harris, Philadelphia, Pa.
246.—TOYS AND FANCY GOODS.—Strasburger, Fritz & Pfeiffer, New York, N. Y.
247.—MEDICINAL PREPARATION.—George B. Thurston, Lynn, Mass.

EXTENSIONS.

ROXANNA RICE, of Lancaster, Mass., executrix of BENJAMIN F. RICE, deceased.—Letters Patent No. 17,184, dated April 28, 1857; reissue No. 920, dated March 6, 1860.
CHARLES CROOK, of New Hope, Pa.—Letters Patent No. 17,205, dated May 5, 1857; reissue No. 548, dated May 4, 1858; reissue No. 3,393, dated April 20, 1869.
CHARLES CROOK, of New Hope, Pa.—Letters Patent No. 17,205, dated May 4, 1857; reissue No. 548, dated May 4, 1858; reissue No. 3,394, dated April 20, 1869.

DISCLAIMER.

CHARLES CROOK, of New Hope, Pa.—Letters Patent No. 17,205, dated May 5, 1857; reissue No. 548, dated May 4, 1858; reissue No. 3,394, dated April 20, 1869.

IMPORTANT TO INVENTORS.

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CHARLES ROGERS, Solicitor and Manager.

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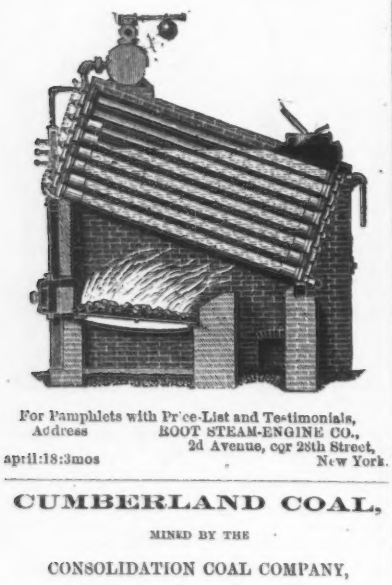

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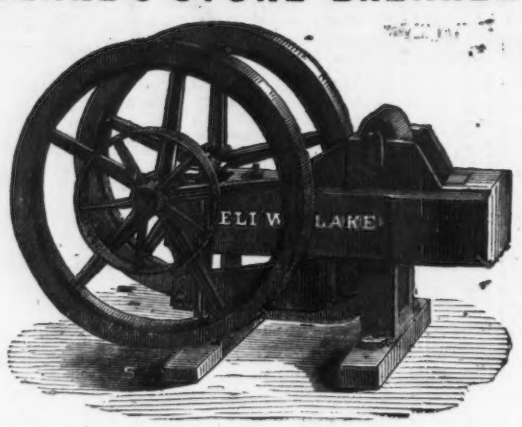

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In the matter of ABRAHAM BININGER and ABRAHAM B. CLARK, Bankrupts.

Notice is hereby given that the undersigned, as Assignee of the above-named bankrupts, will sell at public auction, at the Merchants' Exchange Salesrooms, No. 111 Broadway, in the City of New York, on the 17th day of May, 1871, at 12 o'clock, at noon, by E. H. Ludlow & Co., Auctioneers, two parcels of land adjoining each other, situate partly in Spottsylvania county, Virginia, and partly in Orange county, Virginia, containing together seven hundred and seven acres of land, known as the Vaucluse Gold Mining property, together with the mines, minerals, metals, and metallic substances, buildings, improvements, fixtures, and appurtenances thereto belonging, including two steam engines, and all other mining machinery and utensils used in the mining operations now, or recently, carried on at the said Vaucluse mine, etc.

The sale will be subject to confirmation by the Court.

Detailed description of the property, and an inventory of the improvements, fixtures, etc., may be had upon application to the undersigned, or to his attorneys, Messrs. BANGS, SEDGWICK & NORTH, No. 137 Broadway, or to the Auctioneers.

New York, March 16, 1871.
JOHN S. BEECHER, Assignee,
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1871.

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The Annual meeting of the Stockholders of this Company was held on Monday, May 1st, and adjourned till Monday, May 15th, in order to give Stockholders due notification.

The adjourned meeting will be held at the office of the company at three o'clock P. M.

A full attendance is desired, as business of importance will be brought up for consideration and action.

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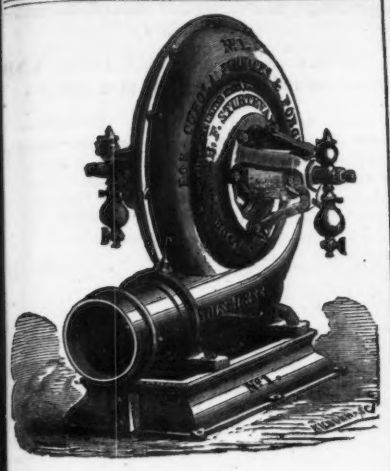

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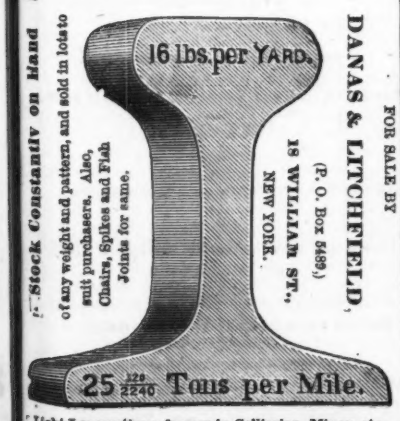

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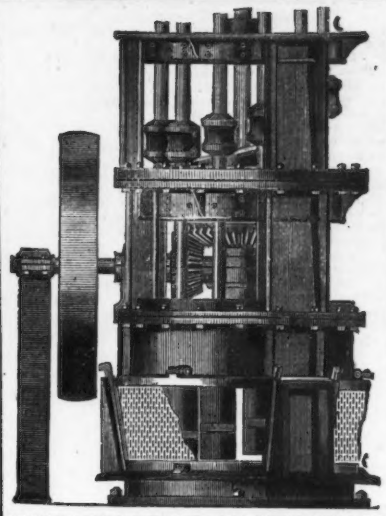

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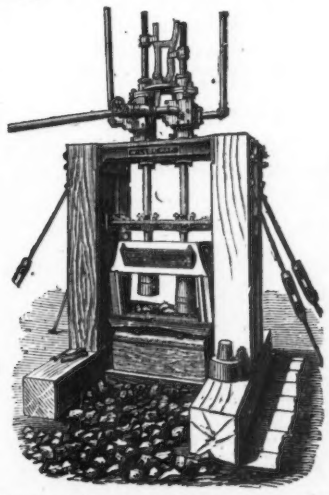

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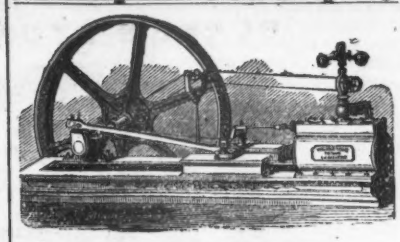

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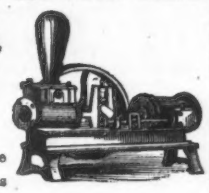

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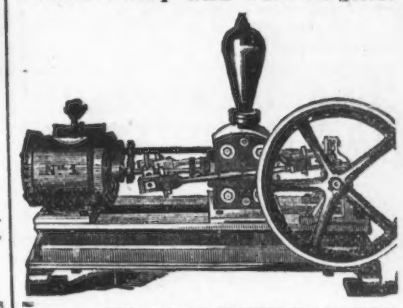

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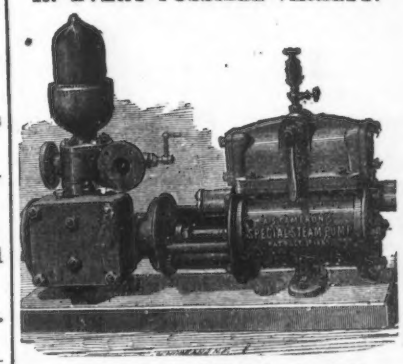

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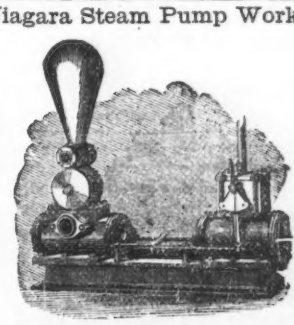

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We desire to pay out the coming year not less than a Quarter of a Million of Dollars from our receipts and reserves, for the services of Volunteer Agents alone, in all the States, Territories, and Provinces of North America. Our paper challenges comparison with the best Journals of Arts and Engineering in the world. It is at the same time one of the cheapest publications ever issued from the press; and to all its attractions we now add a range of Premiums tantamount almost to a free gift of our paper, our labor, our earnings, for the year, for the sake of introducing THE MANUFACTURER AND BUILDER to myriads of readers, whose patronage in future years will recompense our present lavish outlay.

For these premiums are to be not only offered, but **paid**; not only paid, but paid **promptly**, to the letter and spirit of the description, and to the satisfaction of all. Every premium is of the best and most desirable kind we can select, and from manufacturers whose names are a guarantee of excellence.

The premiums range from twenty-five cents to twelve hundred dollars in value—the prices annexed are in no case exaggerated, but the actual cash value invariably—so that one who aims at a large premium will not lose his labor even if obliged by any cause to suspend his efforts, because it is never too late to decide what premium to select, and no list is too small to earn a valuable prize, or rather a choice of many valuable prizes.

Every class of persons can share in this profitable employment, at times, in ways and in places suited to their circumstances, and with rewards adapted to their different desires.

You never know what you can do until you Try.

Thousands of persons, of both sexes, once straitened and perplexed to get a living, have suddenly found out that they had the gift to **get rich by canvassing!** Study the nature of the business, and particularly human nature; study the arguments and inducements for subscription to THE MANUFACTURER AND BUILDER, lay your plans well, and get every body to help you, and hen let nothing discourage or stop you.

In the following table is given the price of each article, and the number of subscribers required to get free, at $1 50 a year; also at the club rate of $1 a year. The descriptions of a few articles are given in the fourth column, the balance is given in our *Descriptive Premium Sheet*, which will be sent on application to those who contemplate getting up clubs.

List of Premiums and Terms for Vol. III., 1871.

A Free Field for Everybody. No Competition.

No.	*Names of Premium Articles.*	*Price of Premium.*	*Number of Subscribers required at $1 50*	*at $1*
	FROM PATTERSON & BROS.			
1—Tool-Chest		$45 00	60	190
2—Case Mathematical Instruments		9 00	18	55
3—Case Mathematical Instruments		15 00	22	75
4—Pocket Knife		1 50	4	21
5—Pocket Knife		2 00	5	22
6—Pocket Knife		2 50	6	25
7—Lady's Pocket Knife		2 00	5	22
8—One dozen Knives and Forks		14 00	21	70
9—One dozen Knives and Forks		18 50	27	90
10—One dozen Knives and Forks		22 00	33	110
11—One dozen Knives and Forks		25 50	39	124
12—Carver and Fork		5 00	13	37
13—Fluted Sharpening Steel		2 50	6	25
	FROM HALL, ELTON & CO.'S PLATE.			
14—One dozen Tea-spoons, medallion		5 75	14	40
15—One dozen Table-spoons, medallion		12 00	19	65
16—One dozen Table Forks, medallion		12 00	19	69
17—Butter-Knife, medallion, solid		1 00	4	
18—Soup-Ladle, medallion		5 75	14	40
19—Ice or Water-Pitcher, No. 3		17 00	26	80
20—Pocket Fruit-Knife, No. 12		2 00	5	22
21—Revolving Butter-Cooler, No. 80.		8 00	16	52
22—Cake-Basket, No. 1867		10 00	18	58
23—Caster, 6 bottles, chased, No. 2039		9 25	18	54
24—Fruit-Basket, No. 200		13 50	21	75
25—Child's Cup, No. 041		2 75	6	25
26—Knife, Fork, and Spoon, child's set, morocco case		3 00	8	30
27—One dozen Napkin-Rings, medallion		9 00	17	54
28—Tea Set, gold lined, No. 1822		48 00	52	180
29—Tea Set, No. 1866		36 00	45	135
	FROM COLBY BROS. & CO.			
30—Knife-Cleaner		75	2	
	FROM MABIE, TODD & CO.			
31—Gold Pen and Pencil, rubber case		8 00	15	45
32—Gold Pen and Pencil, rubber case		6 75	13	37
33—Gold Pen, silver or gold holder, in box		4 25	9	32
34—Gold Pen, extension gold case, in box		20 00	29	90
35—Lady's Gold Pen, ivory holder, in box		2 75	6	25
	FROM HENRY RUSSELL & CO.			
36—Downer Mineral Oil Lamp, No. 1956		4 75	10	35
37—Downer Mineral Oil Lamp, No. 1955		9 25	17	56
	FROM C. F. A. HEINRICH.			
38—St. Germain Student Lamp, largest size		8 25	15	45
	FROM FAIRBANKS & CO.			
39—Family Scales		14 00	21	70
	FROM COLBY BROS. & CO.			
40—Clothes-Wringer		7 50	10	35
	FROM ALEXANDER M. LESLEY.			
41—Refrigerator, the Zero, No. 38		38 00	42	142
42—Cooler, the Newport, No. 1		12 00	15	45
43—Hot-Air Coal Furnace, the Gothic, No. 9		125 00	135	450
44—Hot-Air Wood Furnace, Gothic, No. 10		150 00	162	525
	FROM THE STANLEY RULE & LEVEL CO.			
45—Iron Smoothing-Plane, Bailey's patent		5 00	13	37
46—Iron Smoothing-Plane, Bailey's patent		6 50	14	42
47—Iron Jack-Plane, Bailey's patent		7 50	15	47
48—Iron Fore-Plane, Bailey's patent		9 00	17	55
49—Iron Jointer-Plane, Bailey's patent		10 00	18	58
50—Wood Smoothing-Plane, Bailey's patent		3 00	8	30
51—Wood Fore-plane, Bailey's patent		4 50	10	35
52—Wood Jointer-Plane, Bailey's patent		75	12	36
53—Wood Jointer-Plane, Bailey's patent		50	14	40
	FROM POST & GODDARD.			
54—Machinists' Hand-Taps		17 60	25	75
55—Machinists' Hand-Taps		52 80	65	220
56—Machinists' Hand-Taps (your choice)				
57—Screw-Plates and Dies, size A		5 00	12	37
58—Screw-Plates and Dies, size B 1		8 00	15	45
59—Screw-Plates and Dies, size C 1		10 00	18	58
60—Screw-Plates and Dies, size D 1		13 00	20	70
61—Tap-Wrenches, size A		3 00	7	25
62—Tap-Wrenches, size B		4 00	9	30
63—Tap-Wrenches, size C		5 00	12	37
64—Set of 11 Taper Shank-Twist Drills, No. 1		19 75	29	90
65—Set of 29 Drills, straight shank, mounted, No. 9		12 00	18	60
66—Set of 50 Drills, steel wire gauge from 1 to 60, No. 12		8 00	15	45
67—Set of 21 Taper-Shank Drills, No. 3		44 00	58	175
68—Set of 9 Bit-Stock Drills, 1-16 to ½ in.		2 80	6	25
69—Self-Centering Drill-Chucks, Beach's patent, for jewelers, No. 0		10 00	18	58
70—Self-Centering Drill-Chucks, Beach's patent, for drilling, No. 0		7 00	14	40
71—Self-Centering Drill-Chucks, Beach's patent, 0 to 3-16, No. 1		6 00	13	38
72—Self-Centering Drill-Chucks, Beach's patent, 1 to 60 S. W. E., No. IX		7 00	14	40
73—Self-Centering Drill-Chucks, Beach's patent, 0 to ½, No. 3		14 00	23	77
74—Drill-Grinding Machine, No. 1		10 00	18	58
75—Drill-Grinding Machine, No. 2		20 00	30	95
76—Auger-Bits, your choice of 4 sets		— —	—	—
	FROM L. W. POND.			
77—Foot-Lathe, No. 1		50 00	65	204
78—Foot-Lathe, No. 2		30 90	47	124
	FROM COLBY BROS. & CO.			
79—Miniature Steam-Engine and Boiler		1 36	5	23
	FROM RUSSELL & SPEIR.			
80—Steam-Engine (1 H. P.) and Boiler		300 00	310	1125
81—Steam-Engine (3 H. P.) and Boiler		600 00	640	2250
82—Steam-Engine (5 H. P.) and Boiler		800 00	858	3000
83—Steam-Engine (10 H. P.) and Boiler		1200 00	1285	4500
84—Steam-Pump, C. B. Hardick's, No. 0		120 00	155	540
85—Steam-Pump, Cameron & Co.'s, No. 1		150 00	192	675
86—Steam-Pump, Cameron & Co.'s, No. 2		200 00	257	900
87—American Submerged Pump		12 00	19	65
	FROM GEORGE TALLCOT.			
88—Turbine Water-Wheel, Reynold's, 12 in.		105 00	125	360
89—Turbine Water-Wheel, Reynold's, 24 in.		226 50	270	800
90—Turbine Water-Wheel, Reynold's, 36 in.		364 50	460	1350

No.	*Names of Premium Articles.*	*Price of Premium.*	*Number of Subscribers required at $1 50*	*at $1*
91—Rotary Blower, Root's patent, No. 1		$50 00	70	275
92—Rotary Blower, Root's patent, No. 2		80 00	105	420
93—Portable Forge, Root's patent, No. 1		48 00	65	260
94—Portable Forge, Root's patent, No. 3		80 00	105	420
	FROM THE AMERICAN SAW CO.			
95—Circular Saw		125 00	135	473
96—Cross-Cut Saw		6 60	14	42
	FROM A. P. & M. STEPHENS.			
97—Labor-Saving Vise, 2-in. jaw		4 00	9	32
98—Labor-Saving Vise, 4½-in. jaw		12 00	28	58
	FROM THE STANLEY RULE & LEVEL CO.			
99—Boxwood two-foot Rule		2 50	6	25
100—Silver-Plated Triangular Drawing-Scale		6 00	16	52
101—Pocket Sheet-Metal Gauge		5 00	13	37
102—Arkansas Oil-Stone		1 75	5	22
103—Arkansas Oil-Stone, mahogany case		3 25	8	30
104—Gear or Cog-Wheel Calculating-Rule		4 00	12	36
	WESTERN & COMPANY'S AGENCY.			
105—Preparing and Filing a Caveat		25 00	28	80
106—Application for a Patent		30to40	35	100
107—Application for Patent and first Government fee		46to56	50	150
108—Application for Patent and all Government fees		66to76	75	250
	FROM J. W. HUTCHINSON.			
109—English Breech-loading double-barrel Gun		100 00	110	350
110—English Muzzle-loading double-barrel Gun		75 00	85	250
111—Breech-loading Rifle, the Allen		30 00	46	150
112—Revolver, Smith & Wesson's, No. 1½		12 50	19	65
113—Revolver, Smith & Wesson's, No. 2		15 00	22	75
	FROM MASON & HAMLIN.			
114—Melodeon, portable, No. 1, 4 octave		50 00	66	200
115—Melodeon, resonant, style G, 5 octave		170 00	146	510
116—Pipe-Organ, church use, style No. 29		675 00	579	2000
	FROM J. S. & C. ODELL.			
117—Pipe-Organ		500 00	430	1500
118—Pipe-Organ		700 00	600	2100
119—Bradbury Square Piano-Forte, No. 4		650 00	430	1500
120—Steinway's No. 1 Grand Piano		1200 00	860	3000
	THE AMERICAN WATCH CO., WALTHAM, MASS.			
121—Silver Watch		20 00	32	100
122—Silver Watch		35 50	48	142
123—Gold Watch		50 00	65	200
124—Lady's Gold Watch		100 00	110	350
	FROM THE UNITED STATES WATCH CO.			
125—Silver Watch		40 00	50	150
126—Silver Watch		66 00	75	275
127—Gold Watch		100 00	100	300
128—Silver Watch		104 00	104	312
129—A Sewing Machine (your choice)		65 00	65	200
	FROM MCALLISTER.			
130—Microscope and 48 objects		10 00	14	40
	FROM COLBY BROS. & CO.			
131—Velocipede for Boys		16 00	16	52
	FROM MCALLISTER.			
132—Magic-Lantern, No. 433		20 00	30	95
	FROM H. THOMPSON.			
133—An Easy Chair				
	FROM D. APPLETON & CO.			
134—New American Cyclopædia, 16 vols		80 00	80	213
	FROM G. & C. MERRIAM.			
135—Webster's Unabridged Pictorial Dictionary		12 00	15	45
136—Webster's National Pictorial Dictionary		6 00	10	35
	FROM WESTERN & COMPANY.			
137—One back vol. Manufacturer and Builder, unbound, post-paid		1 75	6	25
138—Two back volumes Manufacturer and Builder, unbound, post-paid		3 50	11	37
139—One back vol. Manufacturer and Builder, bound, post-paid		2 50	9	32
140—Two back volumes Manufacturer and Builder, bound, post-paid		5 00	18	58
141—Cover for binding the Manufacturer and Builder, post-paid		60	3	21
142—A $10 Library (your choice from list in special sheet),	"	10 00	18	58
143—A $15 Library,	"	15 00	24	85
144—A $20 Library,	"	20 00	31	106
145—A $25 Library,	"	25 00	38	125
146—A $30 Library,	"	30 00	44	144
147—A $35 Library,	"	35 00	50	162
148—A $40 Library,	"	40 00	56	177
149—A $45 Library,	"	45 00	62	192
150—A $50 Library,	"	50 00	68	207
151—A $60 Library,	"	60 00	80	237
152—A $75 Library,	"	75 00	100	282
153—A $100 Library,	"	100 00	125	360

All paid through by mail or express.

154—A choice of good Books (see terms in another column)

155—A choice of convenient Book-Cases (see special sheet)

156—A choice of popular Music (see terms in special sheet)

157—A choice of Games and Toys, (see terms in special sheet)

We have taken especial pains to select in making up our price list the NEWEST and very BEST articles. No charge will be made for boxing or packing any article on our list. The Premiums, Nos. **4** to **7** inclusive, **31** to **35** inclusive, **78** **99**, **101**, **105** to **108** inclusive, **121** to **128** inclusive, **137** to **141** inclusive, **154**, **156**, **157**, will each be delivered FREE of charge by mail or express (at the Post-office or express office nearest recipient) to any place in the United States or Territories. The other articles cost the recipient only the freight after leaving the manufactory of each, by any conveyance specified.

As an aid to those who engage upon large clubs, we will count subscriptions by *one* individual for 1869, 1870, and 1871, as *three* subscribers toward a premium. Every *new* subscriber should have the work from the beginning. Bound volumes may be counted in the same way—each as one subscriber—except, of course, when they are obtained as a premium.

Do not fail to note the following Points:

1. All subscribers sent by one person count, though from one or a dozen different post-offices. But

2. State with each name or list of names sent that it is for a premium.

3. Send the names as fast as obtained, that the subscribers may begin to receive the paper at once. You can have any time, from one to six months, to fill up your list.

4. Send the exact money with each list of names, so that there may be no confusion of money accounts.

5. Old and new subscribers all count in premium clubs, but a portion, at least, should be new names; it is partly to get these that we offer premiums to canvassers.

6. Specimen numbers, cards, and show-bills will be supplied free, as needed by canvassers; but they should be used carefully and economically, as they are very costly.

7. Remit money in Checks on New York banks or bankers, payable to order of WESTERN & COMPANY, or send Post-Office Money Orders. If neither of these is obtainable, Register Money Letters, affixing stamps both for the postage and registry; put in the money and seal the letter in the presence of the postmaster, and take his receipt for it. Money sent in any of the above ways is at our risk.

DESCRIPTIVE LIST OF PREMIUMS.

Every Premium in the annexed list is described in the December MANUFACTURER AND BUILDER, *and also in a* **Special Descriptive Sheet**, *which will be sent* **free** *to every one desiring it. We have room here for the following only:*

No. 1—Chest of Good Tools.—We are able, through the special favor of Messrs. Patterson Brothers, of 27 Park Row, to offer chests of the very finest quality of tools, of kinds and prices named below. Similar tools could be purchased for half the money; but these are all A No. 1, for practical use, and worth a dozen common articles. For this we have the guarantee of Messrs. Patterson, which is amply sufficient for us, and for all who know them. Any of these tools may be ordered of them. We make up only a single premium, which contains a full assortment for all common purposes. The tools are of regular size, and but few additions would be required for a journeyman carpenter. The assortment we offer is as follows: 1 tool-chest, $8; 1 jack-plane, $1 75; 1 smooth-plane, $1 50; 1 fore-plane, $2 25; 1 handsaw, 22 in., $1 75; 1 compass saw, 10 in., 50c.; compass, 6 in., 37c.; 1 adze-eye hammer, No. 4, $1 25; 1 hatchet, No. 2, 90c.; 1 draw-knife, 7 in., $1 12; 1 try-square, 6 in., 70c.; 1 bevel, 8 in., 75c.; 1 chalk-line and spool, 30c.; 1 mallet, 30c.; 1 pair of pliers, (steel,) 5 in., 60c.; 1 pair of calipers, 4 in., 3dc.; 1 brace, No. 2, $2 25; 1 auger-bit, ea., ¼ in., 30c.; ⅜ in., 32c.; ½ in., 45c.; 1 in., 60c.; 1 centre-bit, ea., ½ in., 21c.; ¾ in., 23c.; 1 in., 25c.; 1¼ in., 35c.; 1½ in., 40c.; 6 gimlet-bits, assorted, 90c.; 3 gimlet-bits, assorted, 33c.; 1 screw-driver bit, 25c.; 1 flat countersink, 25c.; rose, do., 25c.; snail, do., 25c.; 1 octagon reamer, 30c.; 1 taper-bit, 30c.; 1 screw-driver in handle, ea., 3 in., 30c.; 6 in., 50c.; 1 gouge in handle, ea., ½ in., 50c.; 1 in., 70c.; 1 chisel in handle, ea., ¼ in., 30c.; ½ in., 35c.; ¾ in., 40c.; 1 in., 50c.; 1¼ in., 60c.; 1 framing-chisel, ea., ¾ in., $1; 1 in., $1 10; 1¼ in., $1 20; 1 auger, ea., ¾ in., 70c.; 1 in., 80c.; 1¼ in., 90c.; 1 set bradawls in handles, $1 35; 1 rule, 2 feet, 25c.; 1 saw file, ea., 4 in., 14c.; 5 in., 17c.; 1 flat bastard file, 8 in., 30c.; 1 wood-rasp, 50c.; 1 soldering copper, 60c.; solder nails, etc., $1 25;—**$45 00.**

Nos. 2, 3—Mathematical Instruments for Draughting, Drawing, Etc.—Very convenient not only for architects and mechanics, but for boys and girls. These are neatly fitted in beautiful rosewood cases, having dividers with flexible joints, and points, semi-circles, pencil and penholders, rulers, etc., etc. All the pieces in No. 2 are finished in brass and steel; those in No. 3 are German-silver and steel. The pieces are the same in each, but No. 3 is of extra beauty and workmanship. 18 subscribers at $1 50 each secures No. 2, and 22 at $1 50 each, No. 3.

Nos. 4, 5, 6, 7—Pocket Knives.—Here's for the boys and girls. These premiums are among the most pleasing and useful that we have ever offered. Every boy, and girl too, wants a pocket knife. We give them an opportunity to obtain a most valuable one for merely a little effort. These knives are from Messrs. Patterson Bros. No. 4 is a neat, substantial knife, with three blades and buck-horn handle. No. 5 is a still finer article, with four blades and buck-horn handle. No. 6 is an elegant knife, with four blades and shell handle. No. 7 is a lady's pocket-knife, a beautiful article, with four blades and shell handle.

Nos. 8, 9, 10, 11, 12, 13—American Table Cutlery.—We are glad to be able to offer really good articles of American manufacture, such as are competing successfully with the best foreign goods. ***Messrs. Patterson Bros., 27 Park Row,*** who supply us with these articles, are also importers of English goods. They recommend these knives, manufactured by the ***Meriden Cutlery Co.,*** as equal to any cutlery in the market, and their recommendation is a guarantee wherever they are known. We offer four kinds knives, and three sizes of each kind. No. 8 have rubber handles, which are actually boiling-water-proof, so that, if they were accidentally to remain in it for several minutes, or even hours, they would not be injured. The blades are of the best steel, and warranted Dessert size, with forks, sold at $14. For 23 subscribers at $1 50, or 78 at $1, we will give either the medium size or the table size, sold at $15 50. No. 9 have ivory handles, are selected with great care, have steel blades, and are beautiful goods. Dessert size, with forks, sold at $18 50. For 31 subscribers, at $1 50, or 100 at $1, we will send the medium size, sold at $20 50. For 34 at $1 50, or 112 at $1, we will send the table size, sold at $22 50. No. 10 are made of solid steel, and are triple-plated all over with pure silver, which will wear for a long time, while the knife is actually indestructible by ordinary use. Dessert size, with forks, sold at $22. For 37 subscribers, at $1 50, or 118 at $1, we will give the medium size, sold at $24 50. For 38 at $1 50, or 120 at $1, we will send the table size, sold at $25. For 38 at $1 50, or 120 at $1, we will send the table size, sold at $25. No. 11 have steel blades, triple-plated with silver, and larger ivory handles, and are really splendid goods. Dessert size, with forks, sold at $25 50. For 42 subscribers, at $1 50, or 128 at $1, we will give the medium size, sold at $28. For 45 subscribers at $1 50, or 143 at $1, we will give the table size sold at $30 50. The forks, which accompany these premiums, Nos. 8, 9, 10, are made of genuine albata, and warranted double-plated with coin-silver. The forks with No. 11 are warranted triple-plated with coin-silver. These forks are also furnished to us by Messrs. Patterson Bros. The carving-knife and fork, and fluted steel, are made by

PUBLICATIONS.

the Meriden Cutlery Co., with the best ivory balanced handles.

Nos. 14 to 29—Silverware for the Table.—What would become of elegance and refinement in the furnishing of homes if the ladies (God bless them!) had not such an amiable passion for endlessly beautifying everything around them? Ever since Eve first set out the fruit of Paradise on its broad leaves to entertain the angel guests of Adam, it has been the province of her lovely daughters to spread the social board with attractions still more tempting to the eye than to the palate. What, that becomes a woman, will not a woman do to make her table shine? We condole with them that their means are not always equal to their good taste, and propose that henceforth no lady shall lack a lustrous silver tea-set, or other piece of similar elegance, unless she chooses to. Look at the following premiums, all of the celebrated manufacture of Messrs. HALL, ELTON, & Co., 36 Park Row, New York; No. 28 is silver-plated, gold-lined, beautifully chased **Tea Set** of six pieces, consisting of a coffee-pot, two teapots, a creamer, a sugar-bowl, and a slop-bowl. The style of this set is very neat, new and elegant. Messrs. Hall, Elton & Co, warrant these goods to be their best triple plate. This is a very desirable premium. No. 29 is a tea-set with same number of pieces, triple-plated, plain, new style.

Nos. 31, 32, 33, 34, 35—GOLD PENS, Rubber Mounted with Ever-Pointed Pencils—Pens in Gold and Silver Holders—Pens and Pencils in Extension Cases.—No. 31 has a gold-mounted rubber case, with pencil, and a No. 4 gold pen, manufactured by MABIE, TODD & Co., 180 Broadway, New York. This and the next, No. 32, are, we think, really the best things of the kind manufactured. The fact that hard rubber is used, shows that the gold for the mountings, etc., is of the finest quality, as rubber, on account of the sulphur contained in it, can not be mounted with any other without tarnishing. When closed, the pencil No. 31 is only 5 inches long, (No. 32, 3¼ inches,) but it opens to a length of 5¾ inches. The price for the holder and pencil of No. 31 is $6, pen $2; and of No. 32, or smaller size, $5 for the case, and $1 75 for the pen. Fifteen subscribers will give you the former, or gentleman's size, and 13 the latter, or lady's size. No. 33 is a No. 6 gold pen, with silver or gold-plated holder with an ebony handle—a very neat, desirable business-pen. By describing the kind of pen you prefer, we can probably select one that will suit your hand perfectly. We send these by mail, in a neat turkey morocco box, lined with velvet, in which they can be kept, protected from injury. No. 34 is a large pen, in a fine extension case, round or fluted, and richly engraved. The gold is 14 carats fine. These pens, which are nicely put up in boxes, are a very beautiful thing for a present. Price $20, and sent, postage paid, to any address, upon receipt of 29 subscribers at $1 50 each. No. 35 is a lady's gold pen, with ivory holder. Price, $2 75. This is indeed a very neat and beautiful pen for ladies' use. We send it, postpaid, by mail, inclosed in a handsome velvet-lined morocco box, for 6 subscribers.

No. 38—The Celebrated St. Germain or German Student's Lamp.—as it is sometimes called. This lamp is made and furnished to us by C. F. A. HINRICHS. It scarcely needs eulogium, being the standard thing in our leading colleges, both among students and professors. They reject gas, even where it is most plentiful and convenient, and save their much-worked eyes by the motionless pure white light for which this lamp is so remarkable. No other artificial illumination approaches so nearly to the still colorless sunlight. The secret is in the scientific adaptation of burner and chimney to produce that perfection of draught by which absolute combustion is attained without vibration. The porcelain shade softens the light most agreeably. The lamp slides on a vertical standard, and is adjusted by a set-screw at any desirable elevation to accommodate the work or the eyes. The reservoir is elevated above and at a short distance from the burner, (communicating by a pipe,) so that the oil is always cool and out of reach of flame. The reservoir can be taken out of its telescopic socket, and carried away to another room and filled and returned, without putting out the light. The lamp will be a treasure worth no little trouble to obtain to any one who needs strong light, or who values eye-sight, economy, neatness, pure air, and freedom from trouble and annoyance with lamps; as in all these points it is without a peer. The price of these lamps is $8, with 25 cents for packing. The mineral sperm oil can be had from most respectable dealers, or ordered in packages of any size (1 gallon upward) from Messrs. HENRY RUSSELL & Co., 38 Park Place, New-York.

No. 39—Family Scales.—These scales combining the advantages of counter and platform scales, are peculiarly adapted to household purposes. They weigh from ½ ounce to 240 lbs. They have a scoop or pan for weighing flour, sugar, and other house stores, and a platform for heavier articles, and are just such an apparatus as is needed for in-door or out-door use, occupying less than two feet square. These scales are manufactured by the well-known FAIRBANKS & Co., No. 252 Broadway New York, whose weighing apparatus has long ranked as the standard in all parts of the country. Send to them for circulars, if desired.

Nos. 45-53—Bailey's Patent Planes.—To those who have used these planes and know their value, is but small praise to say that they are superior to any others made. They are so far ahead of any others that there can be no comparison between them. They are self-adjusting in every respect. Both the wood and iron planes are entirely independent in themselves, requiring neither hammer, screw-driver, nor wrench to replace or adjust the cutter, which is held firmly in place and can be instantly released by use of the cam and its thumb-piece. The cutter is adjusted by simply turning a thumb-screw under the bed-piece upon which the plane-iron rests. By this the cutter can be adjusted to any thickness of shaving. The Stanley Rule and Level Co., 55 Chambers Street, New York, warrant these planes to be of the best stock and finish. The various numbers and sizes of these planes which we offer give carpenters, mechanics, and others desiring them, an opportunity to get a complete set of either the wood or iron planes as premiums. The smooth planes, of which we offer two sizes, are 5½ inches long, 1¾ inch cutter; and 8 inches long, 1¾ inch cutter.

Jack plane..	14	in. long, 2	in. cutter.	
Fore "	18	" " 2⅜	" "	} Iron.
Jointer "	22	" " 2⅜	" "	

In the wood planes the lengths and widths of cutter embrace all sizes made. Forty-four subscribers at $ .50 each, or 141 subscribers at $1 each, will get a complete set of the wood-planes. Sixty-nine subscribers at $1.50 will get a complete set of the iron planes, which will last a life-time. If larger sizes than those given are wanted, a few extra subscriptions will be required, according to the difference in the price.

Nos. 54-76—Machinists' Tools.—This series of premiums, consisting of machinists' tools, etc., has been selected and put up at the suggestion of several practical men with whom we have consulted in regard to the subject. These gentlemen, who have a practical knowledge of the tools, and of the requirements of all who have any thing to do with the working of metals, give their unqualified approval of the tools we have selected. This list of premiums has been made so extensive that every man who has any industrial operations to carry on will find some tool or tools absolutely necessary to him. By sending us clubs of subscribers to THE MANUFACTURER AND BUILDER these tools may be obtained by the smallest possible amount of labor. Of the qualities of these tools, in point of finish, we know them to be the best in the market—the best, without challenge. When a man has a set of any of them in his tool-chest, he knows he has the means of producing work equal to any that can be done. We obtain these tools from the general agents, Messrs. POST & GODDARD, 109 Liberty Street, New York.

No. 77—Foot-Lathe No. 1.—Of these useful articles we offer two kinds. No. 1 is perfectly adapted for most kinds of turning in wood or metals; also drilling, boring, polishing, sawing, etc. It seems to be the size desired by most people. This is proved by the great numbers of them sold. This lathe takes a piece between centres 19 inches long and 6¼ inches wide in diameter. It weighs 200 pounds. It is fitted with two pointed centres, one spur-centre, face-plate turned and polished, two rests, one 9 and the other three inches long; also centre key and wrench combined, which fits the screw heads in different parts of the lathe. The balance-wheel weighs 45 pounds, is turned true, and is polished. It has two sizes for change of speed. This size of lathe has a great many extra parts made for it, so that whenever they are wanted they can be obtained. This is a very valuable point, as in buying other machines of the kinds only such things as happen to fit can be used, and they are not always to be found when wanted. The Rev. JOHN TODD, D.D., speaking of lathes, says in regard to these, "For price, for finish, for beauty and workmanship, I have never seen any American lathe so desirable. Of the No. 1 he says: "Nobody can own the lathe without daily gratitude." We procure these lathes through Mr. LUCIUS W. POND, 98 Liberty street, the well-known manufacturer of machinists' tools. Few people can obtain one of these lathes more easily than by obtaining 65 subscribers for THE MANUFACTURER AND BUILDER, for which we ship this premium, without any additional charge for boxing. The regular price is $50. We include leather belt 8 feet long, which costs 90 cents in the price given in the table.

No. 78—Foot Lathe, No. 2.—Our subscribers are frequently asking for second-hand lathes, saying at the same time that such a one would answer their purpose, and probably come cheaper. There are many others who do not care for so complete a lathe as No. 1. The No. 2, we think, will answer this demand. It is made of cheaper materials, but in the same style as lathe No. 1. The frame is of wood, with curved legs, which give it a neat and attractive appearance. It is painted and ornamented in the best style. The bed is made with iron slides three feet long. Will take a piece between centres 21 inchhes long and 6¼ inches in diameter. It has an iron pulley like No. 1. The spindle runs accurately. The face-plate takes off, and the centres are fitted to tapering sockets. Tailstock spindle traverses with a left-hand screw. Everything is well fitted and finished. The balance-whee is the same pattern as for lathe No. 1, and is turned true. The lathe, with face-plate, long and short T rests, two pointed centres, spur-centre, and wrench, packed for transportation, costs $30. For this we also include the leather belt, 8 feet long, which is used on the driving wheel. We box this lathe and deliver it on the cars for a club of 47 subscribers at $1 50 each, or 124 at $1. The twist-drills and chucks—premiums 65, 66, and 69 to 73—especially the smaller sizes, are just the things for these lathes. The chucks, No. Ox, 2 and 3, cost $2 extra for fitting in the lathe. Those desiring further information in regard to the premium may send to WESTERN & Co., 37 Park Row, New York, for an illustrated pamphlet.

No. 79—The Dollar Steam-Engine.—This is a real working steam-engine and boiler, which runs half an hour, or until its fill of water is evaporated, by means of a small spirit-lamp, which forms a part of it. It can not explode or get out of order. A most instructive as well as entertaining toy. Sent, prepaid, for 5 subscribers at $1 50. It is manufactured by COLBY BROTHERS & Co.

Nos. 80, 81, 82, 83—Compact and Powerful Portable Steam-Engine and Boiler.—BAXTER'S patent is acknowledged by many experienced engineers to be the most perfect combination, of standard principles exclusively, and thorough workmanship, ever made in a portable engine. At the same time such is its compactness and the scale and system on which it is manufactured, (by the Colt Armory, at Hartford, Ct.,) that it is afforded at the lowest price ever known for the same (actual) power. It is made by machine tools constructed expressly for it, of standard interchangeable parts throughout, like the celebrated American watches. Consequently we are able to make it one of our most attractive and valuable premiums. Besides, it is warranted to consume less fuel per horse-power than any other engine. This is in consequence, partly, of the improved arrangement of the boiler and the cylinder being entirely let into the steam-space, to save room and heat. The one-horse engine and boiler (which, like the others, will run above, not below rated power) stands but five feet high, over all, by two feet in diameter. This is premium No. 80, costs $300, and can be had for 320 subscribers at $1 50 each, or 1125 at $1 each. The five-horse engine and boiler stands 6¼ feet high by 3 feet in diameter, costs $800, and can be had for 858 subscribers at $1 50 each. The ten-horse engine costs $1200, and will run a good sized manufactory. There is now no reason why any body should be without a first-class steam-engine, especially as these engines are so simple, snug, safe, and economical of fuel that they can be run in any apartment by the fire required to warm it, and by and person of common intelligence, and will be received from the factory in perfect readiness for use. For running small lathes, drills, etc., circular and scroll saws, printing-presses, corn-huskers, cider-mills, fanning-mills, feed-mills, cotton-gins and hullers, cheese-presses, churns, pumps, washing-machines, sewing-machines, rotary blowers for forges and other purposes, etc., the smallest of these engines will be found thoroughly effective, and as little incumbrance and trouble as a kitchen stove. For business, however, we recommend to try for one of ample rather than of bare sufficiency.

Nos. 84, 85, and 86—Steam-Pumps.—These steam-pumps are of the best class and quality, economical in the use of steam, and capable of being applied in various ways. No. 84 is one of Hardick's manufacture, which took the first prize at the Fair of the American Institute a year ago. Nos. 85 and 86 are two sizes of the celebrated Cameron pump. Nos. 1 and 2. The first has a steam cylinder 4½ by 7 inches, and its capacity of ordinary speed is 75 gallons per minute, and costs $150. Size No. 2 has a steam cylinder 6 inches in diameter, with 8-inch stroke. It costs $200, and is capable at ordinary speed of delivering 30 gallons of water per minute. These pumps are remarkable for their compactness, simplicity, and durability. The valves are large and not liable to become choked up. By simply removing the bonnet, access can be had to them for inspection or repair.

Nos. 105 to 108—To Procure a Patent without Money.—We have met with many having valuable inventions, which inventors are anxious to get patented, but are unable to afford the expense, and consequently fail to secure the profits which a patent might produce. To such as are in this position, we make the following liberal offer: No. 108—We will prepare an application for a patent, attend to its passage through the Patent Office, and pay all government fees and incidental expenses attending the same, for any inventor presenting a patentable invention, who will get up a club of seventy-five subscribers for THE MANUFACTURER AND BUILDER for one year at $1,50 each, or 250 at $1 each, and send us the money by post-office order. If this application should be rejected, they may send us an additional list of thirty subscribers at $1.50 each, and the subscription money for the same, on receipt of which we will prepare and prosecute a second application, paying all government fees and incidental expenses. No. 107—For a list of fifty subscribers at $1.50 each, or 150 at $1 each, with the cash accompanying it, we will prepare an application, attend to its passage through the office, and pay the government fee ($15), the applicant paying the second government fee of $20. No. 106—For a list of thirty-five subscribers at $1.50, sent in the same way, we will prepare and prosecute an application, the applicant paying the government fee. No. 105—for twenty-eight subscribers at $1.50 each, or eighty at $1 each, we will prepare and file a caveat, furnish the necessary drawings, (which we also furnish in all the above cases), and pay all government fees. All cases placed in our hands under these arrangements will receive our best attention, equally with those for which our fees have been paid in cash, and will be appealed to the Board of Examiners-in-Chief if necessary, the applicant paying the government fee of $10 on such appeal. If the inventor has no model to accompany his application, he may procure additional subscribers, the premium on which (see cash rates) will enable him to pay for the model. A club of 100 names has been obtained in a single establishment where from 150 to 200 hands are employed. A village of 500 inhabitants will take this number readily.

No. 129—Sewing Machines.—Your choice! A $65 machine for 65 subscribers, at $1.50 each.—It makes no difference to us which machine we send, or whether it is selected at first or at the last moment. No charge for boxing the machines; they go safely as freight. For circulars, giving full particulars in regard to style of machines, fixtures, etc., as well as instructions, send to **Grover & Baker Manufacturing Co.**, 495 Broadway, New York; **Florence Sewing Machine Co.**, 505 Broadway, New York; **Wilcox & Gibbs Sewing Machine Co.**, 658 Broadway, New York; **Singer Sewing Machine Co.**, 458 Broadway, New York.

Nos. 137, 138—Volumes of the Manufacturer and Builder.—The unbound volumes of THE MANUFACTURER AND BUILDER consist of a set of numbers for a year, each separate in its own paper cover. These volumes amount to a valuable Library on all matters pertaining to the Industrial Arts, and contain more varied information on manufacturing, building, and mechanical subjects than can be obtained in books costing three times as much. The price of the volumes unbound is $1.50 each, at the office, or $1.75 if sent by mail, as they must be post-paid. They are profusely illustrated, the engravings used in them having alone cost thousands of dollars. For ordinary use, the sets of numbers unbound will answer quite well.

Nos. 139, 140—Bound Volumes of the Manufacturer and Builder.—*New* subscribers almost invariably desire to secure the back numbers of THE MANUFACTURER AND BUILDER from its commencement. Some desire them bound in our uniform style, while others prefer to get the loose numbers and have them bound to suit their own tastes. *Our* binding is very neat, and being done in large quantities at one time, is furnished at a *very cheap* rate. It is moreover very handsome, being of cloth, with gilt title and back, sides embossed and ornamented with a neat architectural device stamped in gold. The price of the volumes is $2.50 each, sent post-paid.

No. 141—Covers for Binding the Manufacturer and Builder.—These are described in premium 139, 140. Now ready for 1869 and 1870. Be careful to state *which year* you require. Any country binder will insert the year's numbers in one of these covers at a moderate cost. Price, 50 cents; sent, *postpaid*, on receipt of three subscribers at $1,50 for each cover.

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No. 154—General Book Premium.—Any one sending twenty-five or more names may select books from our list to the amount of ten cents for each subscriber sent at $1; or thirty cents for each name sent at $1.20; or sixty cents for each name at $1.50. *This offer is only for clubs of twenty-five or more. The books will be sent by mail or express, prepaid through by us.*

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" " "	100 "	65 00	15 00
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PATENTS—No. 76,499, April 7, 1868.. No. 96,465, Nov. 2, 1869.
No. 93,113, July 20, 1869 No. 106,606, Aug. 23, 1870. Address GEORGE N. MOWBRAY,
No. 94,969, Sept. 21, 1869 No. 106,607, Aug. 23, 1870. NORTH ADAMS, MASS.

[Feb. 21, 3m.]

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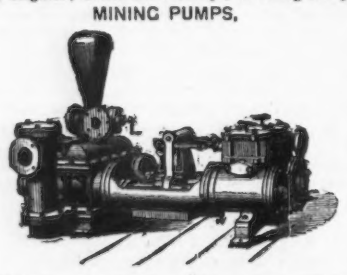

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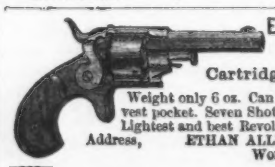

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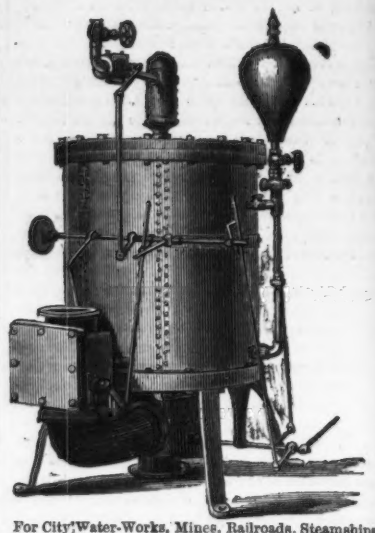

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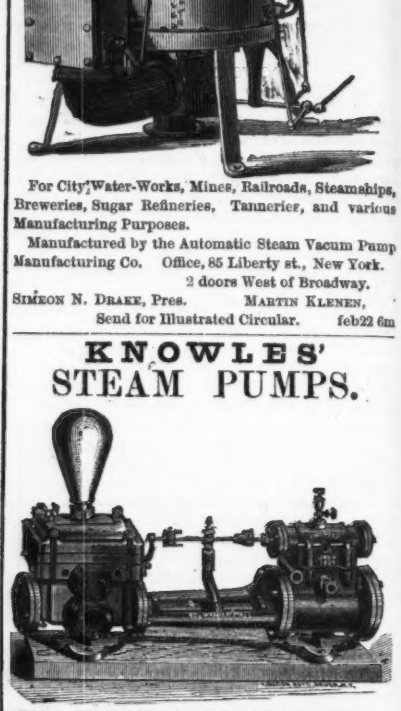

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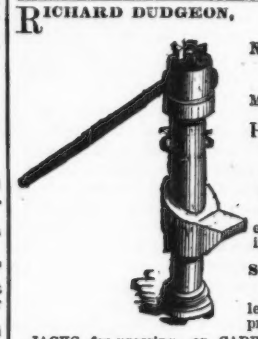

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